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The institute was designed to provide intensive exposure to evaluation models and some important new evaluation techniques for persons employed in key administrative, supervisory, consultant, or instructional roles in science education. Seventy-seven persons participated in the Institute. A Semantic-Differential scale in pre- and post-response situations was administered in an attempt to determine if significant attitude shifts occurred during the Institute. Participant daily reaction sheets were used and thoroughly reviewed by the Institute staff each day. An "Institute Evaluation" instrument was developed and administered at the end of the Institute. Participant evaluation of the institute was highly favorable. The analysis of responses to the Semantic-Differential Scale demonstrated a highly significant difference between pre- and post-scores surpassing the .001 level in the direction of a positive shift in attitude. (BC)

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FINAL REPORT  
Project No. 8-8045  
Grant No. OEC-1-7-070006-3789

INSTITUTE ON EVALUATION FOR  
SCIENCE PROGRAMS

April 1968

U.S. DEPARTMENT OF  
HEALTH, EDUCATION, AND WELFARE

Office of Education  
Bureau of Research

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Institute on Evaluation  
For Science Programs

Project No. 8-8045  
Grant No. OEC-1-7-070006-3789

Institute Director: Herbert A. Smith

April 1968

The research reported herein was performed pursuant to a grant with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

National Science Teachers Association

Washington, D.C.

### Acknowledgments

The Director is particularly indebted to Dr. Blaine Worthen, Dr. Robert Hammond and Dr. Albert Eiss. As senior instructors and team leaders, Dr. Worthen and Dr. Hammond played key roles in the success of the Institute. Their contributions during the planning phases were also invaluable. Dr. Eiss had large responsibilities for the initiation and preparation of the proposal and in the detailed planning for the Institute. He was also extremely helpful with the details involved in arranging appropriate physical facilities and in the day to day operation of the Institute.

Herbert A. Smith  
Institute Director

## TABLE OF CONTENTS

	Page
Introduction . . . . .	1
Method . . . . .	2
Results . . . . .	3
Discussion . . . . .	3
Conclusions . . . . .	4
Appendix A:	
Announcement Letter . . . . .	A-1
Application Blank . . . . .	A-3
Acceptance Letter . . . . .	A-4
Rejection Letter . . . . .	A-5
Program . . . . .	A-6
Appendix B:	
List of Participants Accepted . . . . .	B-1
Occupational Classification and Geographical . . . . .	
Distribution of Participants . . . . .	B-7
Appendix C:	
Semantic-Differential Scale . . . . .	C-1
Participant Daily Reaction Sheet . . . . .	C-2
Institute Evaluation Instrument . . . . .	C-3
Appendix D:	
Perspective for Evaluation of Science Education . . . . .	D-1
Evaluation--The Process of Providing Information to Aid . . . . .	
in Decision Making . . . . .	D-11
Indicators of Change by Metfessel and Michael . . . . .	D-17
Product Evaluation Worksheet #1 . . . . .	D-23
Selected References in Evaluation . . . . .	D-25
Simulation Problem Materials . . . . .	D-26
Some Methods of Data Collection . . . . .	D-76
Appendix E:	
Appendix Table 1: "Responses by Teachers and Supervisors to Statements About the Institute . . . . .	E-1
Appendix Table 2: Evaluation by Teachers and Supervisors of Specific Activities by Days . . . . .	E-2
Analysis of Responses to the Semantic-Differential Scale . . . . .	E-3

## Introduction

Science education has been characterized in recent years by many significant changes involving theory, curriculum, facilities, and instructional materials. Although innovations have been plentiful, there has often been little attempt to evaluate the effectiveness of such efforts and many changes can be viewed in retrospect to have been ill-advised. One of the major problems is the lack of individuals experienced in evaluating science programs. A large number of science supervisors have risen through the ranks of classroom teaching, with little or no specialized training for their new positions. College and university teachers who are retained as consultants for developing science programs are experienced in their subject matter fields, but often lack specialized training in education, particularly in evaluation. As a result, many of the evaluative procedures are carried out in a haphazard fashion and effective procedures are not identified and inefficient practices are not eliminated.

The Institute was designed, therefore, to provide an intensive exposure to evaluation models and some important new evaluation techniques for persons employed in key administrative, supervisory, consultant or instructional roles in science education. More specifically it was anticipated that the Institute would contribute to the following objectives.

1. Provide a small but effective group of individuals capable of making critical evaluations of science programs in local school districts.
2. Provide a basis for further dissemination of evaluation techniques through follow-up workshops and inservice education at the local level.
3. Provide materials and insights helpful in planning future national Institutes to upgrade evaluation of science education programs.
4. Identify potential leaders in the use of evaluation procedures who could staff further institutes and inservice programs at the local level.
5. Stimulate a more intensive and comprehensive approach to evaluation problems and further work in the field.

## Method

In order to achieve the objectives of the Institute, it was decided to invite between 100 and 120 participants who were intensively involved with the problems of science education either as supervisors of science education in the public schools or college level trainers of science teachers. Individuals were selected from all levels of education, elementary through college.

Following approval of the project, an intensive planning session was held with the Director, senior instructors, an NSTA representative, and one additional Institute staff member in attendance. Senior instructors and other instructional staff members were drawn from the Evaluation Center at Ohio State University and from Project EPIC located at the University of Arizona. Specific plans were developed and a detailed program was formulated.

Following the planning session, application blanks and an explanatory letter were sent to members of the Association for the Education of Teachers of Science, the National Science Supervisors, and to selected individuals known to be heavily involved in science education programs. In addition, the NSTA made a separate mailing to supervisors and consultants in science education maintained on the NSTA Registry. In total, approximately 10,000 letters were sent. Because of the short time between the approval of the proposal and the dates for the Institute, the time between mailing the invitation letters and the Institute was short. (Between two and three weeks). In spite of the time limitation, 173 applications were received. (It should be borne in mind that attendance was entirely at the expense of the individual or of his employer.) Of these, 107 were invited to attend. Copies of the application blank, explanatory letter, acceptance letter, letter of regret for those who could not be accommodated as well as the program mailed to prospective participants are included as Appendix A. Seventy-seven participants were involved in the Institute, although a few were absent at either the beginning or the end of the Institute. Individuals who accepted but who did not attend the Institute are indicated by the red circle around their identifying number in the roster of those invited in Appendix B. In addition to the regular Institute participants, several observers were present part of the time. These represented the NSTA, the NSF and the U. S. Office of Education. One NSF participant was present for all sessions. A breakdown showing geographical representation and levels of professional responsibility is provided in Appendix B-7.

In planning the Institute, it was evident that a program designed to sensitize participants to evaluation procedures and techniques should itself be a reasonable model with respect to the

evaluation process. Accordingly, considerable thought was given to the problem. It was decided to use a Semantic-Differential scale in pre- and post-response situations in an attempt to determine if significant attitude shifts occurred during the Institute. In addition, participant daily reaction sheets were used and these were collected and thoroughly reviewed by the Institute staff at the end of each day. Finally, a document, "Institute Evaluation" was developed and administered at the end of the Institute. Copies of the Semantic-Differential Scale, the participant daily reaction sheets and the final evaluation instrument are included as Appendix C.

Some of the instructional materials which were used, much of it specifically developed for the Institute, are included as Appendix D. In addition, packets of materials, too bulky to be included as a part of this report, were prepared and distributed by the Project EPIC staff. One complete set of the materials is included with this report.

### Results

The Institute was held in Crabtree Auditorium. The program ran very nearly as it had been planned. Evaluations of the Institute were analyzed using the computer facilities of Project EPIC. For purposes of analysis, participants were separated into "teachers" and "supervisor" groups. The details of the analysis of the responses to the Semantic-Differential scale and to the Institute Evaluation instrument are shown in Appendix E.

### Discussion

From an examination of the participant evaluations (Appendix Table E) it can be seen that the responses to the Institute were highly favorable. It should be noted that the items in the first section of the Institute Evaluation Instrument (Appendix C) were not all polarized in the same direction. Thus, in items such as 3, 28 and 41, "disagree" or "strongly disagree" responses constitute an endorsement for the Institute.

The day to day evaluations of the specific activities are shown in Appendix Table F. There is strong evidence that the participants thought the program was reasonably balanced with the majority of responses falling in the "about right" category. There is evidence that more time should have been allowed on the second day program which was essentially concerned with the

simulation problem. There was a feeling among some of the participants that the simulation was either unrealistic or a "bad example" of problems in evaluation of science programs. (This view was not shared by the Director who thought it might quite possibly be just too realistic.) There was an indication that more work in refinement of the simulation problem and more time for participants might have paid large dividends.

The daily evaluation forms were also helpful. From their analysis it became apparent that "evaluation" was being oriented too strictly to project assessment, particularly as these related to ESEA Title I and Title III activities. Comments on the evaluation sheets enabled the Institute staff to shift much more strongly in the direction of teacher, classroom and general program evaluation.

The analysis of the responses to the Semantic-Differential scale demonstrated a highly significant difference between the pre and post scores surpassing the .001 level of significance in the direction of a positive shift in attitude. The analysis of the responses and pertinent comments are included as Appendix E 3.

One participant tended to be highly critical and felt that the purpose of the Institute was misrepresented. He appeared to have expected specific answers to such questions as whether CBA or CHEMS should be installed in his school. In any case, he expected a detailed evaluation of many of the specific science curriculum studies which have been funded.

### Conclusions

The Institute appears from available evidence to have been a highly successful operation. It is apparent from the extremely short response time allowed between the announcement letters and the deadline for applications that there is a felt need for assistance in evaluating science programs. There was evidence that the presentation of the CIPP evaluation model provided needed insights. Reactions of the participants seemed to indicate that, at present, context and input evaluation are likely to be particularly weak. More familiarity with process and product evaluation seemed evident. In any future Institute, it seems probable that the CIPP model and the simulation problem could and should be more closely related.

The success of this Institute clearly indicates that future efforts of this kind should be planned. It is suggested that Institutes operated in connection with selected NSTA regional conferences would be especially appropriate. Institutes should not necessarily be limited to such meetings, however.

## NATIONAL NSTA INSTITUTE IN EVALUATION OF SCIENCE EDUCATION

Dear Colleagues in Science Education:

An unusual opportunity is being provided for key personnel in science education to participate in a four-day institute on the evaluation of science teaching programs. The institute on evaluation of science instruction will be held just prior to the NSTA Annual Convention in Washington, D. C. You are invited to apply as an institute participant. The institute is sponsored by NSTA under a grant from the U. S. Office of Education.

Presentations will be made by recognized authorities in evaluation. Participants will be provided with an opportunity to sharpen their insights into the evaluation process in a seminar setting. Objectives of the institute are:

1. Suggest ways of evaluating plans for educational improvement which include:
  - a. Evaluation of a proposed strategy for improvement.
  - b. Evaluation of procedures including provisions for feedback.
  - c. Evaluation of outcomes of improvement programs.
2. Selection of appropriate evaluation techniques designed to provide information necessary for making decisions about educational programs, classroom practices and curriculum changes.
3. Development of ability to discriminate between well written and poorly written objectives given several sets of educational objectives of variable quality.
4. Describe interaction analysis as a useful evaluative tool.
5. Develop a well documented report of the project including a clear and concise evaluation of the institute.

Time is very short and an almost immediate response is necessary from those who desire to participate. Below are the "facts" relating to the institute. If you are interested, please return your application form by return airmail. In any case, applications must be received no later than March 13.

When: The Institute begins at 9:00 a.m., March 24 and ends March 27 at 4:30 p.m.

Where: All sessions of the Institute will be in Washington, D. C.

Deadline: Applications must be received by March 13. Please use airmail.

Fees: None. But participants must be supported by their employers or by themselves.

Staff: Dr. Blaine R. Worthen, Associate Director, Evaluation Center,  
The Ohio State University.

Mr. Michael D. Hock, Research Associate, Evaluation Center,  
The Ohio State University.

Dr. Robert L. Hammond, Director, Project EPIC, University of  
Arizona.

Staff Associates, Project EPIC, University of Arizona

Dr. Herbert A. Smith, Director of Teacher Education, Colorado  
State University.

Eligibles: Only 100 participants can be accommodated. Selection will  
be made from those applicants who are actively engaged  
as a supervisor or consultant for a local or state  
educational agency or who are employed by an institution  
of higher education and responsible for supervision of  
science teachers, teaching of science methods course and/or  
direction of research in science education.

Housing Accommodations: Arrangements have not been completed. However,  
NSTA will arrange for a block of rooms, probably  
at one of the Washington hotels, at the most  
favorable rate possible.

Sincerely yours,

*Herbert A. Smith*  
Herbert A. Smith  
Institute Director

203 Liberal Arts Building  
Colorado State University  
Fort Collins, Colorado 80521  
Telephone: 303-491-5305

APPLICATION FOR ACCEPTANCE INTO THE  
NATIONAL NSTA INSTITUTE IN EVALUATION OF  
SCIENCE INSTRUCTION

Name: \_\_\_\_\_

Address: Street \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Employer: \_\_\_\_\_ Present Job Title: \_\_\_\_\_

Respond as appropriate in columns A, B, C, and D.

A

B

C

D

Job Classification: Responsibility as to:

☐ Teacher Grades taught: \_\_\_\_\_

☐ Full-time Total educational  
experience:

☐ Administrator Level: \_\_\_\_\_

☐ Part-time \_\_\_\_\_ years

☐ Supervisor Level: \_\_\_\_\_

☐ Other \_\_\_\_\_ Level: \_\_\_\_\_

Educational Background

Bachelors Degree

Institution: \_\_\_\_\_

Date: \_\_\_\_\_

Major: \_\_\_\_\_

Minor: \_\_\_\_\_

Graduate Study

Institution(s) \_\_\_\_\_

Degrees, if any: \_\_\_\_\_

Major: \_\_\_\_\_

Professional Affiliations

What contribution would you hope the NSTA Institute would make in helping you fulfill better your present responsibilities?

If accepted, do you want housing accommodations made for you? ☐ yes ☐ no

(Participants will be provided with information as to the housing of the Institute as soon as possible. This will probably be in a local hotel and the most favorable rates it is possible to obtain will be negotiated.)

Best address to use in corresponding with you:

Telephone number: (Include area code)

Please note - Return application by airmail to: Dr. Herbert A. Smith  
203 Liberal Arts Building  
Colorado State University  
Fort Collins, Colorado 80521  
Telephone: 303-491-5305

Fort Collins, Colorado  
March 15, 1968

Dear Participant:

I am happy to inform you that you have been accepted as a participant in the National NSTA Institute in Evaluation of Science Education. A schedule of the program is included for your information.

The Institute will be held in Crabtree Auditorium in the NEA Building located at 1201 Sixteenth Street, N. W. If you have requested housing reservations, they are being made for you at the Burlington Hotel. If you indicated on your application that you wanted reservations made for you, please fill out the slip stapled to this letter and mail to the hotel at once. The rates are \$11 for single and \$15 for double rooms. If you desire a double room, you should so state when you mail the attached form indicating the time of your arrival. Please note that it is your responsibility to notify the Burlington Hotel of your arrival time.

As a reminder, participants should fully understand that attendance at the Institute is either at their expense or at the expense of their employer. No funds to defray any part of the cost of attendance are available through the Institute itself.

We are looking forward to a stimulating and productive Institute and anticipate being able to greet you there.

Sincerely yours,

*Herbert A. Smith*  
Herbert A. Smith  
Institute Director

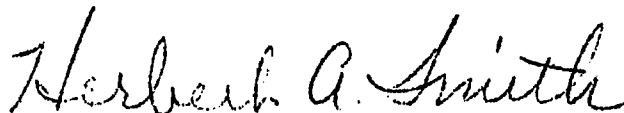
Fort Collins, Colorado  
March 15, 1968

Dear Colleague in Science Education:

The response to the invitation to apply for the NSTA Evaluation Institute exceeded both expectations and the capacity to accommodate all who submitted applications. Consequently, it is with considerable regret that your application cannot be honored. If the Institute is successful, it may be possible in the future to sponsor similar conferences in connection with NSTA regional meetings. Your name and application form will be retained as evidence of your interest and desire to participate in an Institute devoted to problems of evaluation and forwarded to the NSTA central office.

Thank you for so promptly submitting your application. As you can probably easily conceive, the problem of selecting 100 participants from all those who applied was not easy. Selection had to be done quickly and with the exercise of a comparatively high degree of subjective judgment. To the charge of subjectivity, the Director pleads guilty and begs your indulgence.

Sincerely yours,



Herbert A. Smith  
Institute Director

NATIONAL NSTA INSTITUTE IN EVALUATION OF SCIENCE INSTRUCTION  
Crabtree Auditorium, NEA Building  
1201 Sixteenth Street, N. W.  
Washington, D. C.

March 24

9:00 - 9:30 a.m.	Opening Session Greetings and Announcements Introduction of Staff
9:30 - 10:15 a.m.	"A Perspective for Evaluation of Science Education" Dr. Herbert A. Smith
10:15 - 10:30 a.m.	Coffee Break
10:30 - 12:00 a.m.	Evaluation as the Base for Educational Improvement
12:00 - 1:30 p.m.	Lunch
1:30 - 3:00 p.m.	CIPP Evaluation for Decision-Making
3:00 - 3:15 p.m.	Coffee Break
3:15 - 4:30 p.m.	Designing Evaluation Designs

March 25

9:00 - 10:30 a.m.	Techniques for Gathering Evaluation Information
10:30 - 10:45 a.m.	Coffee Break

Simulated Evaluation Design Problem in Science Education  
(remainder of the day)

10:45 - 12:00 a.m.	Focusing the Evaluation
12:00 - 1:30 p.m.	Lunch
1:30 - 3:00 p.m.	Collecting, Organizing, and Analyzing Information
3:00 - 3:15 p.m.	Coffee Break
3:15 - 4:30 p.m.	Administering, Reporting, and Interpreting Evaluation

March 26

9:00 - 10:00 a.m.	Introduction to the EPIC Evaluation Concept, Model and Structure Dr. Robert L. Hammond
10:00 - 10:30 a.m.	Introduction to the Writing of Behavioral Objectives in Science Dr. Wayne Roberson
10:30 - 10:45 a.m.	Coffee Break

10:45 - 12:00 a.m.	Small Group: Objective Writing Session Richard Powell, Drs. Terry Cornell, Wayne Roberson, Robert Kraner, and Robert Armstrong
12:00 - 1:30 p.m.	Lunch
1:30 - 3:00 p.m.	Small Group: Critique of Teacher-Developed Behavioral Objectives in Science, with Discussion
3:00 - 3:15 p.m.	Coffee Break
3:15 - 4:00 p.m.	Small Group: Individual Participant Objective Writing
4:00 - 4:30 p.m.	Small Group: Critique of Participant Objectives

March 27

9:00 - 9:30 a.m.	Introduction of Observational Systems for Teacher Self-Appraisal Drs. Terry Cornell and Wayne Roberson
	<p>Characteristics of Observation Systems:</p> <ul style="list-style-type: none"> <li>a. Common Communication</li> <li>b. System for Tallying Behavior</li> <li>c. Procedures for Analyzing Behavior</li> <li>d. Skill Development</li> <li>e. Evaluation (comparison of pre-active phase of teaching with interactive phase.)</li> </ul>
9:30 - 10:30 a.m.	Observational System for Coding Teacher Objectives, Methods, and Expressions Utilizing Video Tapes and Computer Analysis--Dr. E. Wayne Roberson
10:30 - 10:45 a.m.	Coffee Break
10:45 - 12:00 a.m.	Flander's Interaction Analysis, Description of Coding Process, Emphasizing Use of Matrices and Feedback--Dr. Terry Cornell
12:00 - 1:30 p.m.	Lunch
1:30 - 3:00 p.m.	Small Group Session: Resource People Available to Discuss Morning Presentations and Their Utilization in the Evaluation Process
3:00 - 3:15 p.m.	Coffee Break
3:15 - 3:45 p.m.	Response to Institute by Selected Participants
3:45 - 4:15 p.m.	Evaluation of Institute (Individual written responses)
4:15 - 4:30 p.m.	Closing Remarks and Adjournment

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March 24-27, 1968

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Vestal Central Schools  
Vestal, New York 13850
52. Kriebs, Jean  
Assistant Professor  
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1676 Susquehanna Street  
Rydal, Pennsylvania 19046
53. Labahn, William F.  
Science Coordinator  
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1706 W. Algonquin Road  
Arlington Heights, Illinois 60005

54. Lancaster, David N.  
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55. Lawrence, Otis O.  
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Oklahoma City, Oklahoma 73105
56. Lockard, J. David  
Associate Professor of Science Educ.  
Director, Science Teaching Center  
University of Maryland  
5905 33rd Avenue  
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57. Lujan, Henry M.  
Secondary Science Supervisor  
District #11  
Colorado Springs Public Schools  
239 Elmwood Drive  
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58. Maben, Jerrold William  
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59. MacDonald, Mary Hope  
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60. Maddron, Dallas W.  
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61. Magat, Phyllis L.  
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62. Matthews, Ann E.  
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S. Acton, Massachusetts 01720
63. Metzger, Melvin A.  
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Cecil County Board of Education  
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Elkton, Maryland 21921
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Denver, Colorado 80226
66. Moretti, Victor  
District Science Chairman  
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39 Poplar Street  
Fords, New Jersey 08863
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East Side Union High School Dist.  
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68. O'Neill, Raymond A.  
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69. Palmer, Carroll  
Chairman, Science Curricula  
Committee of School District  
Chairman, Science Department  
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Monongalia County School District  
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70. Palmer, Elra M.  
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Baltimore, Maryland 21218
71. Pancellia, John R.  
Science Supervisor  
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72. Pappas, Richard J.  
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76. Pickens, John  
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78. Procyk, Ida Margaret  
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86. Shutts, J. Hervey  
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87. Simonian, George  
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88. Smith, Eric J.  
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407 W. 17th C  
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89. Smith, Richard A.  
Professor, Natural Science Dept.  
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San Jose, California 95114

90. Spencer, Marvin G.  
Science Supervisor  
Board of Education of Frederick County  
115 East Church Street  
Frederick, Maryland 21701
91. Strong, Virginia B.  
Staff Developer  
Education Development Center  
55 Chapel Street  
Newton, Massachusetts 02160
92. Thompson, Glenn M.  
Science Coordinator  
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93. Tucker, Katharine  
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95. Vivian, V. Eugene  
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96. Voelker, Alan M.  
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97. Wagner, Earle B.  
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98. Wagner, Howard I., Jr.  
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99. Wailles, James R.  
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Accomac County School Board  
Accomac, Virginia 23301
103. Westfall, Jonathan  
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106. Zoller, Alfred H.  
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107. Zurhellen, Joan G.  
Secondary Science Supervisor  
Shelby County Board of Education  
1978 Nellie Road  
Memphis, Tennessee 38116

## OCCUPATIONAL CLASSIFICATION OF PARTICIPANTS

Professor, Colleges and Universities	20
Directors of Curriculum	6
Supervisors and Coordinators, School Districts, K-12	33
Supervisors and Coordinators, School Districts, 7-8-9	3
Supervisors and Coordinators, School Districts, Elementary	10
Supervisors and Coordinators, School Districts, Secondary	22
Science Chairmen, High School	5
State Department of Education Consultants	7
High School Principal	1

## GEOGRAPHICAL DISTRIBUTION OF PARTICIPANTS

Alabama	2	New Hampshire	1
California	10	New Jersey	6
Colorado	5	New York	10
Delaware	3	North Dakota	1
Florida	3	Ohio	7
Georgia	2	Oklahoma	1
Idaho	2	Oregon	1
Illinois	5	Pennsylvania	10
Iowa	1	Puerto Rico	1
Louisiana	2	Tennessee	1
Maryland	7	Texas	3
Massachusetts	5	Vermont	1
Michigan	3	Virginia	4
Minnesota	1	West Virginia	4
Missouri	3	Wisconsin	2

29 states and Puerto Rico

Applications Received	173
Participants Accepted	107

## EVALUATION

fast					slow
sad					happy
nice					awful
small					large
unpleasant					pleasant
clear					hazy
weak					strong
interesting					boring
unfair					fair
clean					dirty
sharp					dull
important					unimportant
sour					sweet
cold					hot
good					bad
worthless					valuable
meaningful					meaningless
long					short
distasteful					tasty

## PARTICIPANT DAILY REACTION SHEET

Session Date \_\_\_\_\_

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A. Your questions (about content, facilities, etc.)

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B. Your comments (on content, presentation, instruction, facilities, etc.)

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C. Your suggestions (regarding content, instruction, arrangements, etc.)

NATIONAL NSTA INSTITUTE IN EVALUATION  
OF SCIENCE INSTRUCTION  
WASHINGTON, D. C. - MARCH 24-27, 1968

I-N-S-T-I-T-U-T-E      E-V-A-L-U-A-T-I-O-N

Check the appropriate boxes:

Teacher ☐

Elementary ☐

Supervisor ☐

Junior High ☐

Senior High ☐

College ☐

Below are a number of statements concerning objectives and certain teacher self-approach techniques. You are to indicate how much you agree or disagree with each of the statements by encircling the letter representing one of the following expressions.

Strongly Disagree (SD); Disagree (D); Neither Agree nor Disagree (N);  
Agree (A); Strongly Agree (SA)

- |  |    |   |   |   |    |
|--|----|---|---|---|----|
| 1. I now have a better idea of what evaluation is "all about" than I had before this institute.  | SD | D | N | A | SA |
| 2. Evaluation plays a critical role in educational improvement.  | SD | D | N | A | SA |
| 3. The evaluation concepts and techniques presented in this institute have little relevance to evaluation problems I am likely to face in the future.                              | SD | D | N | A | SA |
| 4. Looking at types of decisions (planning, programming, implementing, and consequential) is a useful way to begin to focus on the type of evaluation information which is needed. | SD | D | N | A | SA |
| 5. I feel that I could identify types of decisions which need to be made in most science programs with which I might work.   | SD | D | N | A | SA |
| 6. The CIPP (context, input, process, and product) evaluation model is a useful way to view evaluation of science programs.  | SD | D | N | A | SA |
| 7. Sorting the "lists of decisions" (on day 1 of the institute) into types was a useful technique to illustrate differences among decision types.                                  | SD | D | N | A | SA |
| 8. It is important to do context and input evaluation <u>before</u> deciding on a program or plan of action.   | SD | D | N | A | SA |

9.	In general, I feel that I would know how to conduct context evaluation in planning a science program.	SD	D	N	A	SA
10.	In general, I feel that I would know how to conduct input evaluation in selecting from among alternative programs, etc.	SD	D	N	A	SA
11.	In general, I feel that I would know how to conduct process evaluation in monitoring program activities.	SD	D	N	A	SA
12.	In general, I feel that I would know how to conduct product evaluation in relating outcomes to objectives.	SD	D	N	A	SA
13.	The structure for developing evaluation designs is useful in attempting to design an evaluation for a science program.	SD	D	N	A	SA
14.	I feel I could use the structure for developing evaluation designs to design an evaluation which met minimal evaluative criteria.	SD	D	N	A	SA
15.	Many of the techniques identified on the second day of the institute (e.g., interviews, unobtrusive measures, achievement tests, etc.) are relevant for evaluation in science programs.	SD	D	N	A	SA
16.	I believe that I personally could use most of the techniques if they seemed relevant.	SD	D	N	A	SA
17.	I believe I understand when the varying techniques might be appropriate.	SD	D	N	A	SA
18.	The simulated evaluation design problem was useful in giving me a feel for how one might go about designing an evaluation.	SD	D	N	A	SA
19.	The feedback in the simulation was helpful to me in understanding the design process.	SD	D	N	A	SA
20.	The theory behind Roberson's Self-Appraisal System is good, but is unrealistic in real life.	SD	D	N	A	SA
21.	Developing objectives makes me feel more confident.	SD	D	N	A	SA
22.	I feel a sense of insecurity when attempting to learn a code.	SD	D	N	A	SA
23.	Learning a code makes me feel as though I'm lost in a jungle of numbers and can't find my way out.	SD	D	N	A	SA
24.	Objective writing is something which I enjoy doing.	SD	D	N	A	SA
25.	I become confused and unable to think clearly when learning to code.	SD	D	N	A	SA

- |  |    |   |   |   |    |
|--|----|---|---|---|----|
| 26. I feel that Flander's Interaction Analysis is not adequately designed to provide useful evaluation information.              | SD | D | N | A | SA |
| 27. When I hear the word objective, I have a feeling of dislike.   | SD | D | N | A | SA |
| 28. Coding a teacher's behavior does not serve a useful purpose.   | SD | D | N | A | SA |
| 29. The development of program or educational objectives is a necessary procedure.   | SD | D | N | A | SA |
| 30. Objective writing is too complicated to learn in a one-day workshop.   | SD | D | N | A | SA |
| 31. Flander's Interaction Analysis is good in theory, but is unrealistic in real life.   | SD | D | N | A | SA |
| 32. Beginning teachers are too inexperienced to write objectives.  | SD | D | N | A | SA |
| 33. I feel coding is very useful.  | SD | D | N | A | SA |
| 34. I feel a positive reaction toward the ideas presented at the conference.   | SD | D | N | A | SA |
| 35. I become frustrated when I think about writing objectives.   | SD | D | N | A | SA |
| 36. I approach writing objectives with a feeling of hesitation resulting from a fear of not being skilled in writing objectives. | SD | D | N | A | SA |
| 37. I feel at ease when learning to code.  | SD | D | N | A | SA |
| 38. Roberson's Self-Appraisal System is adequately designed to provide useful evaluation information.                            | SD | D | N | A | SA |
| 39. Developing good program objectives and instructional objectives will facilitate the improvement of teaching procedures.      | SD | D | N | A | SA |
| 40. The objectives of this institute were not the same as my objectives.   | SD | D | N | A | SA |
| 41. I could have learned as much by reading a book.  | SD | D | N | A | SA |
| 42. The instructors really knew their subject.   | SD | D | N | A | SA |
| 43. The daily schedules were too fixed.  | SD | D | N | A | SA |
| 44. There was too much lecture and too little interaction.   | SD | D | N | A | SA |
| 45. I think I would be under a terrible strain when coding teachers.   | SD | D | N | A | SA |
| 46. Objective writing is very important to me.   | SD | D | N | A | SA |

The major topics which were presented in this institute are listed below. Would you please respond to each topic by checking whether you think the time spent on it was too much, too little, or about right.

During the institute, the time spent on this topic was:

(check one)

FIRST DAY

Too Much / About Right / Too Little

1. A perspective for evaluation of science education (Smith)
2. Evaluation as the base for educational improvement (Worthen-Hock)
3. CIPP evaluation for decision-making (Worthen-Hock)
4. Designing evaluation designs (Worthen-Hock)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECOND DAY

Too Much / About Right / Too Little

1. Techniques for gathering evaluation information (Worthen)
2. Simulation: Designing context evaluation (Worthen-Hock)
3. Simulation: Designing input evaluation (Worthen-Hock)
4. Simulation: Designing process evaluation (Worthen-Hock)
5. Simulation: Designing product evaluation (Worthen-Hock)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

THIRD DAY

Too Much / About Right / Too Little

1. EPIC evaluation model  
(Hammond)

☐☐☐

2. Writing and critiquing  
behavioral objectives  
(Arizona team)

☐☐☐

FOURTH DAY

Too Much   About Right   Too Little

1. General observational systems  
for teacher self-appraisal  
(Cornell-Roberson)

☐☐☐

2. Coding teacher behavior:  
Video tape and computer  
analysis (Roberson)

☐☐☐

3. Coding teacher behavior:  
Flander's interaction analysis  
(Cornell)

☐☐☐

4. Evaluation of institute (what  
you're now doing) (Smith)

☐☐☐

Total time spent in the institute was:

☐☐☐

## A PERSPECTIVE FOR EVALUATION OF SCIENCE EDUCATION

Herbert A. Smith  
Director of Teacher Education  
Colorado State University

It is certainly a pleasure to welcome a group of science educators to a conference on the evaluation of science instruction. The fact that the response to the invitation to the Institute was as substantial as it was on the very short notice provided is an index of the current interest and the felt needs which exist for a more adequate and effective approach to the problems of evaluation. The objectives of this meeting were spelled out in some detail in the invitation which went to you along with the announcement of the Institute. However, I think it can be simply stated that the real purpose of the Institute is to determine how science instruction can be improved and how it can be made to have the highest degree of relevancy for all students who are enrolled in the elementary and secondary schools. Evaluation is a key element in any such improvement. The concept guiding this Institute is that evaluation covers a total system: students, teachers, supervisors and administrators, administrative organization, facilities--in short, all those things that impinge directly or indirectly upon the climate for learning.

During the Institute we will have some highly qualified experts in the area of evaluation who will work with you in a variety of situations. We believe that the concepts and materials which they present will prove to be highly beneficial. But in

fairness to them, I think I should state that they do not represent themselves as science educators, rather they are evaluators. Consequently, there are some things that they cannot do. There are specific questions related to science education that they are not qualified, and cannot be expected to be qualified, to answer. Many of these questions are philosophical in nature and require certain value judgments which fall more specifically within the province of science educators. To illustrate, they cannot tell us what we ought to be doing in science education. During their presentation they will raise questions, I presume, which will be pertinent to the decision-making process which is involved in curriculum and program development, but ultimately these decisions are the responsibility of science educators and administrators. To put it another way I would not anticipate that they will answer for us "Where should we be going, and why?" As I understand their role, they expect to be able to tell us "how to go there" more effectively. They will help us identify our possible failures along the way and perhaps help us realize when we can reasonably be said to have arrived at our destination. I hope they will have something to say about the relativistic character of educational objectives.

Essentially, my role in this Institute is to serve an administrative and coordinating function. However, I should like to step aside from these assignments for a few minutes to speak as a science educator and to exercise a director's prerogative by commenting upon the current scene in science

education. There is a substantial basis for believing that a conference devoted to the subject of the evaluation of science education is critically imperative at the present time. In the next few minutes I hope to be able to raise some questions and issues which seem rather vital to science education.

Education has been characterized in recent years by an immense amount of activity and science education has exhibited its full share. But as I have observed the passing scene, our educational establishment often seems like a ship without a rudder or compass but which is, nevertheless, cruising with all engines set at full steam ahead. It reminds me of the legendary Texan who dashed into the Dallas airport and demanded a ticket from the first airline ticket clerk that he encountered. She said, "Well sir, will you tell me where you want a ticket to?" and he said, "Listen, lady, it doesn't make any difference, I've got business everywhere."

It is high time that our fundamental purposes for science instruction receive an intensive and critical examination. I seem to detect no unified consensus as to the direction in which we should head. It is obvious that we need vision as well as skills, wisdom as well as knowledge, and humanity as well as competence, and that our educational system has a major responsibility for seeing that such aspirations are attained. Too often we see a strange hiatus between the existence of knowledge and the logical implications which knowledge has for action. We have intellectual accomplishments not coupled in any way with productive behavior

and personal or social responsibility. Such intellectual sterility may reflect a lack of any real commitment and be a reflection to a large degree of our failure to answer in a convincing manner, "Where are we going?"

Vast sums of money have been spent in developing curriculum materials without any very consistent guide as to what ends will be served by the materials produced. Great masses of materials have been produced in recent years and most of them have reflected an "elitist philosophy." The emphasis has definitely been on subject matter content. The educational axiom that content should be selected in terms of the needs of people has been too cavalierly abandoned. Students often complain bitterly today about the lack of relevance of much of their education for their lives and for the real world. I have said in print elsewhere that I am convinced that materials produced by the large scale curriculum projects which have been so generously funded are largely irrelevant for more than half of the students in our schools. And I think that that statement is probably far too conservative. It may be closer to being irrelevant for 80-85% of our students. I hope that our evaluators will have something to tell us about the kind of standards and expectations which might be related to children and adolescents. What is a "criterion of reasonableness" for educational attainment which should be applied in an educational setting? There are substantial evidences today that too many children are being pushed too far, too fast, and too hard.

It is clearly no secret to many of you that science courses, and most especially physical science courses, do not enjoy high popularity with either high school or college students. Part of this unpopularity may well be related to the question of grading and evaluation. It has always been a mystery to me as to why students usually expect to receive lower grades in science and in mathematics than in other subjects. Often, their expectations are completely fulfilled. One strongly suspects that a certain amount of academic snobbery is the culprit and many science teachers, both in secondary schools and colleges, seem to think that their function is to flunk students rather than to teach them. Avoiding science classes except for the minimum required for graduation may be evidence of good judgment on the part of many gifted students who really cannot risk a "C" or "B" grade if they wish to contend for scholarships or other awards or win entrance into a name university. This statement in itself, of course, may be indicative of some of the serious ailments in our educational system. No large campus or school is likely to be free of the pompous pedant who loudly proclaims that "Nobody gets an A in my class!" The tragedy of this situation is that the clown expects to be rewarded because of the high standards he maintains. One might maintain that either his standards are unreasonable, or he is a poor teacher, or both.

The signs of alienation of youth need no lengthy elaboration here. They are all about us. The statistics on any number of indices are available which show the heavy impact of failures

in schools and in homes; the failures of teachers and parents to meet the basic needs of youth. To list but a few indices would include the present adolescent suicide rate, the incidence of mental illnesses, various psychosomatic afflictions, juvenile crime rates, dropouts, "hippyism," teenage drug addiction and teenage prostitution. Nor are the alienated restricted to minorities, the poor, or the socially and culturally disadvantaged. Suburbia and the "upper-uppers" are also well represented. Youth is in rebellion and the lack of relevancy of their education to their perceived needs and interests is plainly evident.

One always hesitates to deride the current emphasis on subject matter for when he does he is so often interpreted as saying that subject matter is unimportant. Obviously, what is really needed is more and not less subject matter but it affords us little benefit if, in trying to teach the subject matter, we "successfully" alienate the great mass of adolescents. The real issue is to teach functional subject matter in such a way that students recognize and accept its validity and utility. One of the reasons why we have been relatively unsuccessful in reaching many students is to be found in the fact that most of the new programs have been almost exclusively concerned with the cognitive aspect of education and especially with abstract concepts. The affective domain of attitudes, appreciations, hopes, and aspirations have too often been ignored. In fact, often its existence seems not even to have been recognized.

The young do not bring the same motivations to the classroom that scientists bring to their laboratories and yet it would appear that the scientists in their enthusiasm have often projected themselves and their own motivations and interests into many of the materials which they have produced. They have forgotten that the views they hold and the satisfactions they now seek are quite unlike those that they possessed when they were 12, 14 and 16 year old youngsters. The past, particularly of successful men, is often viewed through the rosiest of tinted lenses and selective memory and nostalgia recreate a scene bearing little resemblance to reality which once existed.

The affective domain cannot be ignored for two very substantial reasons. In the first place, it is in the affective domain that we find the driving forces which innervate and direct the energies of youth. Second, it is in the affective domain that we find those qualities which make men, men, rather than animals. For the great mass of human beings, science will always be important in terms of its meaning for human life and society and for only a very few will it be a source of intellectual delight and adventure. Consequently, science cannot be taught in a vacuum apart from its social, political and economic derivatives. Considering the vast forces which the scientists have unleashed it is certainly in the interests of all that those destined to be scientists, and who are now enrolled in our elementary and secondary school classes, should be imbued with

a compassion for humanity, with a concern for larger problems, and a perspective of the place of science in the world including some awareness of its potential for good or evil.

I am sure that in this Institute you are going to hear something about "behavioral objectives." It is certainly pertinent that you should, for the aim of all education is surely to both change behavior and provide the potential for future changes in behavior. Yet, I have to smile when I hear the new gospel preached and listen to the new cliches which extol the ultimate virtues of "behavioral objectives." We find in Ecclesiastes 1:10:

Is there anything whereof it may be said, see this is new? it hath been already of old time, which was before us.

Nearly a century ago Charles Sanders Pierce was learnedly and profoundly debating on "operational theory of meaning" with William James and others, holding that the meaning of a concept was essentially incorporated in a set of operations (behaviors). If one accepts Pierce's thinking it is surely not a long step to the contention that educational objectives can have no meaning except in terms of behaviors. In essence, to speak of behavioral objectives is a tautology. I recall in my own classes of 20 and more years ago of asking students how the class had changed their behavior and disturbing them by the assertion that my course and all the other courses they had taken were worthless to the extent that they had not changed behavior or created a potential for changed behavior in future situational contexts.

But I do not particularly intend to detract from the current emphasis on the "behavior" aspect of educational objectives. Perhaps such emphasis is long overdue. However, I do not think we can identify all those behaviors which are likely to be pertinent. We again run the risk of miring in a swamp which Ernest Bayles calls "specific objectivism." It is really a question of the generality of objectives which is involved. Just how detailed does one become in listing the desired behavior outcomes?

With the present emphasis on behavior there is danger that we will get bogged down with behavioral minutia and lose sight of those broader behavioral objectives which are the real goals of education. It is by no means certain that competence in small behavior units will necessarily add up to those broader behavior patterns which determine the basic life patterns which lead to a good and productive life. Hopefully, a part of our Institute program will bring a degree of realism and practicality to our attempts to assess our progress in the modification of behavior and that it will bridge a dangerous gap by helping us steer between the shoals of behavioral minutia and the reefs of over-extended and meaningless generality.

I suspect that there will be aspects of the science education program in which evaluation is sorely needed which will not be touched upon in any adequate way in this Institute. For years, I have felt that there is an inadequate definition of the role

of the science supervisor. The wide variety of titles and responsibilities assigned is a reflection of this fact. The relationships between system supervisors and building principals, the hierarchy of administrative controls, the processes of planning and budgeting, the informal infra-structure of the system and many other factors have a direct and sometimes deadly influence on the science instructional program. Important as they are, it seems probable that we will not enter into these areas in any depth. I mention these here only to insure that they are not overlooked or thought to be unimportant.

Problems of evaluation are among the most complex in all of education. Consequently, we should not be so presumptuous as to expect this Institute to answer all the questions which might legitimately be raised. Perhaps our functions will have been well served if we are able to increase your sensitivity to problems of evaluation, provide you with some enlarged insights and the opportunity to interact among yourselves, demonstrate some special techniques and stimulate you to think seriously about evaluation as it relates specifically to problems within the context of your own system responsibilities. We expect it to be a working conference and we hope it will be a productive one.

EVALUATION = The Process of providing information  
to aid in decision-making.

-----

#### LACKS IN EDUCATIONAL EVALUATION

1. Lack of adequate definition of and validated theoretical bases for evaluation.
  2. Lack of knowledge about educational decision processes and information requirements.
  3. Lack of appropriate evaluation designs.
  4. Lack of appropriate evaluation instruments, tools, and techniques.
  5. Lack of integrated mechanisms for organizing, processing, and reporting evaluation information.
  6. Lack of trained evaluation personnel.
- 

#### EVALUATION FOR DECISION-MAKING

THESIS: A major purpose of evaluation is to provide information  
for making decisions.

#### RATIONALE:

1. Quality education demands continuing efforts to improve education;
2. Educational improvement requires an appropriate balance of enlightened persistence and change;
3. Obtaining and maintaining this delicate balance requires sound decision-making;
4. Sound decision-making depends upon an appropriate supply of evaluative information.

## COMPARISON OF EXPERIMENTAL AND EVALUATION STRATEGIES

	EXPERIMENTATION	EVALUATION
POSE	To test research hypotheses	To facilitate the continual improvement of a program
SUBJECTS	Units to be measured are randomly assigned to treatment and control conditions	Subjects are assigned to a program based upon their needs and the purpose of the program rather than the requirements of the data collection and analysis designs
CONTROL	Treatment and control conditions are held constant throughout the experiment	Evaluation aims to stimulate improvement in on-going programs
INSTRUMENT ADMINISTRATION	Instruments are administered after a specified period of time--usually a year or sometimes pre and post to the experiment	Instruments are administered to conform with information requirements of decision-makers throughout the program's existence
INTERFERENCE	Avoided during the experiment so as to avoid contamination	An essential means for stimulating change
CRITERIA	Information should be: valid, and reliable	Information should be: valid, reliable, timely, credible, and pervasive

### DECISION-MAKING IN EDUCATIONAL IMPROVEMENT

**PROBLEM:** To evaluate for decision-making, the relevant decisions must be known.

**POSTULATE:** Decisions in educational improvement activities may be classified as:

Planning (focusing needed improvement activities)

Programing (specifying procedure, personnel, facilities, budget, and time requirements for implementing planned activities)

Implementing (directing programed activities)

Recycling (terminating, continuing, evolving, or drastically modifying activities)

## DEVELOPING EVALUATION DESIGNS

The logical structure of evaluation design is the same for all types of evaluation, whether context, input, process or product evaluation. The parts, briefly, are as follows:

### A. Focusing the Evaluation

1. Identify the major level(s) of decision-making to be served, e.g., local, state, or national.
2. For each level of decision-making, project the decision situations to be served and describe each one in terms of its locus, focus, criticality, timing, and composition of alternatives.
3. Define criteria for each decision situation by specifying variables for measurement and standards for use in the judgment of alternatives.
4. Define policies within which the evaluation must operate.

### B. Collection of Information

1. Specify the source of the information to be collected.
2. Specify the instruments and methods for collecting the needed information.
3. Specify the sampling procedure to be employed.
4. Specify the conditions and schedule for information collection.

### C. Organization of Information

1. Provide a format for the information which is to be collected.
2. Designate a means for coding, organizing, storing, and retrieving information.

### D. Analysis of Information

1. Select the analytical procedures to be employed.
2. Designate a means for performing the analysis.

### E. Reporting of Information

1. Define the audiences for the evaluation reports.
2. Specify means for providing information to the audiences.
3. Specify the format for evaluation reports and/or reporting sessions.
4. Schedule the reporting of information.

### F. Administration of the Evaluation

1. Summarize the evaluation schedule.
2. Define staff and resource requirements and plans for meeting these requirements.
3. Specify means for meeting policy requirements for conduct of the evaluation.
4. Evaluate the potential of the evaluation design for providing information which is valid, reliable, credible, timely, and pervasive.
5. Specify and schedule means for periodic updating of the evaluation design.
6. Provide a budget for the total evaluation program.

## KINDS OF EVALUATION FOR DECISION-MAKING

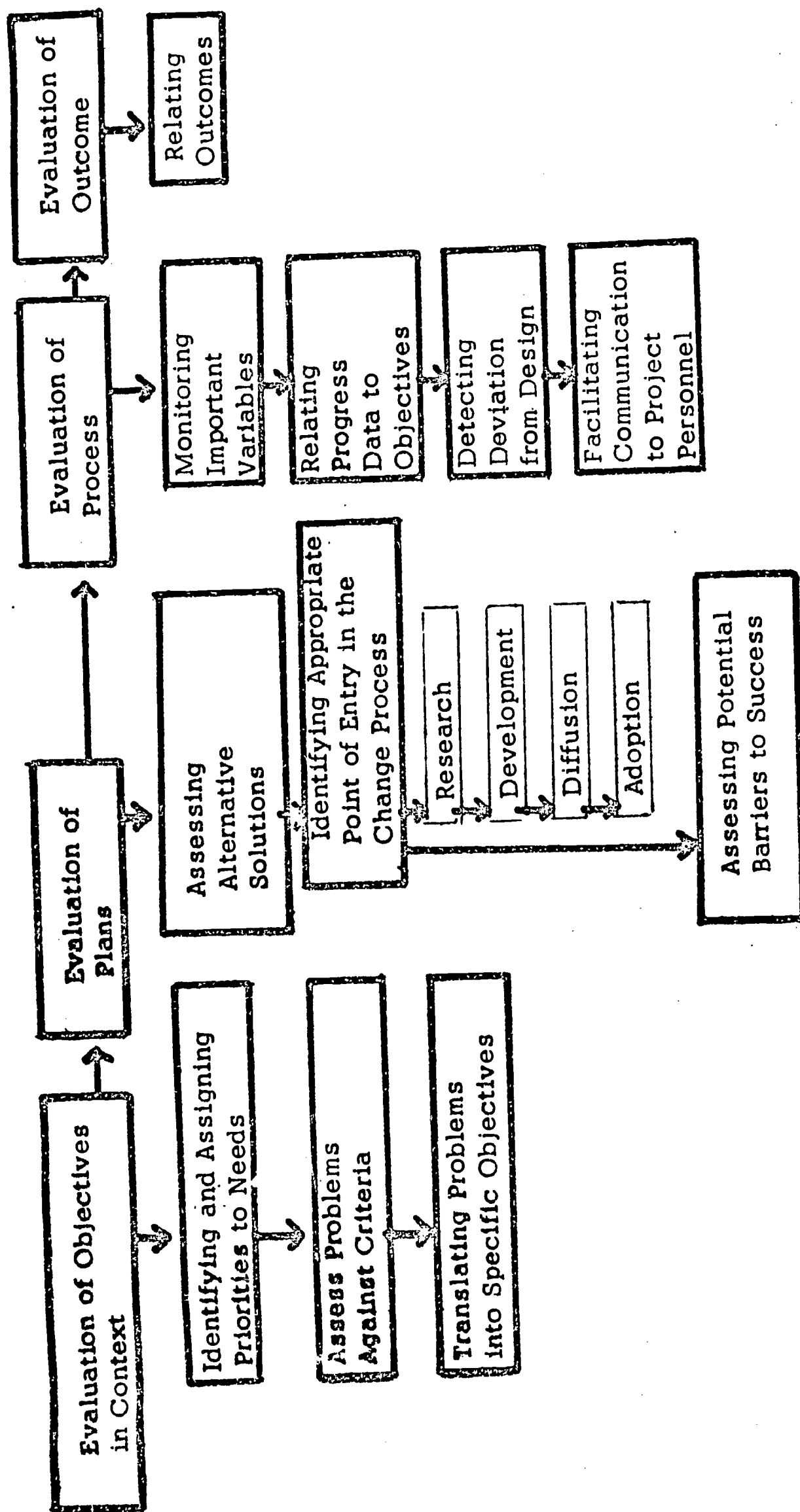
PROPOSITION: Each class of decisions in educational improvement activities requires a relevant kind of evaluation.

Context evaluation is for planning decisions and provides information about "what needs to be done?"

Input evaluation is for programing decisions and provides information about "what can be done?"

Process evaluation is for implementing decisions and provides information about "what is being done?"

Product evaluation is for recycling decisions and provides information about "what has been done?"



# THE CIPP EVALUATION MODEL

RELATION TO  
DECISION  
MAKING IN THE  
CHANGE  
PROCESS

OBJECTIVE

METHOD

Context Evaluation	Input Evaluation	Process Evaluation	Product Evaluation
For deciding upon the setting to be served, the goals associated with meeting needs and the objectives associated with solving problems, i.e., for planning needed changes.	For selecting sources of support, solution strategies, and procedural designs, i.e., for programming change activities.	For implementing and refining the program design and procedure, i.e., for effecting process control.	For deciding to continue, terminate, modify or refocus a change activity, and for linking the activity to other major phases of the change process, i.e., for evolving change activities.
To define the operation context, to identify and assess needs in the context, and to identify and delineate problems underlying the needs.	To identify and assess system capabilities, available input strategies, and designs for implementing the strategies.	To identify or predict, in process, defects in the procedural design or its implementation, and to maintain a record of procedural events and activities.	To relate outcome information to objectives and to context, input, and process information.
By describing individually and in relevant perspectives the major subsystems of the context; by comparing actual and intended inputs and outputs of the subsystems; and by analyzing possible causes of discrepancies between actualities and intentions.	By describing and analyzing available human and material resources, solution strategies, and procedural designs for relevance, feasibility and economy in the course of action to be taken.	By monitoring the activity's potential procedural barriers and remaining alert to unanticipated ones.	By defining operationally and measuring criteria associated with the objectives, by comparing these measurements with predetermined standards or comparative bases, and by interpreting the outcome in terms of recorded input and process information.

D. L. Stufflebeam

**I. Indicators of Status or Change in Cognitive and Affective Behaviors of Students in Terms of Standardized Measures and Scales**

Standardized achievement and ability tests, the scores on which allow inferences to be made regarding the extent to which cognitive objectives concerned with knowledge, comprehension, understandings, skills, and applications have been attained.

Standardized self inventories designed to yield measures of adjustment, appreciations, attitudes, interests, and temperament from which inferences can be formulated concerning the possession of psychological traits (such as defensiveness, rigidity, aggressiveness, cooperativeness, hostility, and anxiety).

Standardized rating scales and check lists for judging the quality of products in visual arts, crafts, shop activities, penmanship, creative writing, exhibits for competitive events, cooking, typing, letter writing, fashion design, and other activities.

Standardized tests of psychomotor skills and physical fitness.

**II. Indicators of Status or Change in Cognitive and Affective Behaviors of Students by Informal or Semiformal Teacher-made Instruments or Devices**

Incomplete sentence technique: categorization of types of responses, enumeration of their frequencies, or ratings of their psychological appropriateness relative to specific criteria.

Interviews: frequencies and measurable levels of responses to formal and informal questions raised in a face-to-face interrogation.

Peer nominations: frequencies of selection or of assignment to leadership roles for which the sociogram technique may be particularly suitable.

Questionnaires: frequencies of responses to items in an objective format and numbers of responses to categorized dimensions developed from the content analysis of responses to open-ended questions.

Self-concept perceptions: measures of current status and indices of congruence between real self and ideal self--often determined from use of the semantic differential or Q-sort techniques.

Self-evaluation measures: student's own reports on his perceived or desired level of achievement, on his perceptions of his personal and social adjustment, and on his future academic and vocational plans.

Teacher-devised projective devices such as casting characters in the class play, role playing, and picture interpretation based on an informal scoring model that usually embodies the determination of frequencies of the occurrence of specific behaviors, or ratings of their intensity or quality.

Teacher-made achievement tests (objective and essay), the scores on which allow inferences regarding the extent to which specific instructional objectives have been attained.

Teacher-made rating scales and check lists for observation of classroom behaviors: performance levels of speech, music, and art, manifestation of creative endeavors, personal and social adjustment, physical well being.

Teacher-modified forms (preferably with consultant aid) of the semantic differential scale.

### III. Indicators of Status or Change in Student Behaviors Other than Those Measured by Tests, Inventories, and Observation Scales in Relation to the Task of Evaluating Objectives of School Programs

Absences: full-day, half-day, part-day, and other selective indices pertaining to frequency and duration of lack of attendance.

Anecdotal records: critical incidents noted including frequencies of behaviors judged to be highly undesirable or highly deserving of commendation.

Appointments: frequencies with which they are kept or broken.

Articles and stories: numbers and types published in school newspapers, magazines, journals or proceedings of student organizations.

Assignments: numbers and types completed with some sort of quality rating or mark attached.

Attendance: frequency and duration when attendance is required or considered optional (as in club meetings, special events, or off-campus activities).

Autobiographical data: behaviors reported that could be classified and subsequently assigned judgmental values concerning their appropriateness relative to specific objectives concerned with human development.

Awards, citations, honors, and related indicators of distinctive or creative performance: frequency of occurrence of judgments of merit in terms of scaled values.

Books: numbers checked out of library, numbers renewed, numbers reported read when reading is required or when voluntary.

Case histories: critical incidents and other passages reflecting quantifiable categories of behavior.

Changes in program or in teacher as requested by student: frequency of occurrence.

Choices expressed or carried out: vocational, avocational, and educational (especially in relation to their judged appropriateness to known physical, intellectual, emotional, social, aesthetic, interest, and other factors).

Citations: commendatory in both formal and informal media of communication such as in the newspaper, television, school assembly, classroom, bulletin board, or elsewhere (see Awards).

"Contacts": frequency or duration of direct or indirect communications between persons observed and one or more significant others with specific reference to increase or decrease in frequency or to duration relative to selected time intervals.

Disciplinary actions taken: frequency and type.

Dropouts: numbers of students leaving school before completion of program of studies.

Elected positions: numbers and types held in class, student body, or out-of-school social groups.

Extracurricular activities: frequency or duration of participation in observable behaviors amenable to classification such as taking part in athletic events, charity drives, cultural activities, and numerous service-related avocational endeavors.

Grade placement: the success or lack of success in being promoted or retained; number of times accelerated or skipped.

Grade point average: including numbers of recommended units of course work in academic as well as in non-college preparatory programs.

Grouping: frequency and/or duration of moves from one instructional group to another within a given class grade.

Homework assignments: punctuality of completion, quantifiable judgments of quality such as class marks.

Leisure activities: numbers and types of; times spent in; awards and prizes received in participation.

Library card: possessed or not possessed; renewed or not renewed.

**Load:** numbers of units or courses carried by students.

**Peer group participation:** frequency and duration of activity in what are judged to be socially acceptable and socially undesirable behaviors.

**Performance:** awards, citations received; extra credit assignments and associated points earned; numbers of books or other learning materials taken out of the library; products exhibited at competitive events.

**Recommendations:** numbers of and judged levels of favorableness.

**Recidivism by students:** incidents (presence or absence or frequency of occurrence) of a given student's returning to a probationary status, to a detention facility, or to observable behavior patterns judged to be socially undesirable (intoxicated state, dope addiction, hostile acts including arrests, sexual deviation).

**Referrals:** by teacher to counselor, psychologist, or administrator for disciplinary action, for special aid in overcoming learning difficulties, for behavior disorders, for health defects or for part-time employment activities.

**Referrals:** by student himself (presence, absence, or frequency).

**Service points:** numbers earned.

**Skills:** demonstration of new or increased competencies such as those found in physical education, crafts, homemaking, and the arts that are not measured in a highly valid fashion by available tests and scales.

**Social mobility:** numbers of times student has moved from one neighborhood to another and/or frequency which parents have changed jobs.

**Tape recordings:** critical incidents contained and other analyzable events amenable to classification and enumeration.

**Tardiness:** frequency of.

**Transiency:** incidents of.

**Transfers:** numbers of students entering school from another school (horizontal move).

**Withdrawal:** numbers of students withdrawing from school or from a special program (see Dropouts).

#### IV. Indicators of Status or Change in Cognitive and Affective Behaviors of Teachers and Other School Personnel in Relation to the Evaluation of School Programs.

**Articles:** frequency and types of articles and written documents prepared by teachers for publication or distribution.

**Attendance:** frequency of, at professional meetings or at in-service training programs, institutes, summer schools, colleges and universities (for advanced training) from which inferences can be drawn regarding the professional person's desire to improve his competence.

**Elective offices:** numbers and types of appointments held in professional and social organizations.

**Grade point average:** earned in postgraduate courses.

**Load carried by teacher:** teacher-pupil or counselor-pupil ratio.

**Mail:** frequency of positive and negative statements in written correspondence about teachers, counselors, administrators, and other personnel.

**Memberships including elective positions held in professional and community organizations:** frequency and duration of association.

**Model congruence index:** determination of how well the actions of professional personnel in a program approximate certain operationally-stated judgmental criteria concerning the qualities of a meritorious program.

**Moonlighting:** frequency of outside jobs and time spent in these activities by teachers or other school personnel.

**Nominations by peers, students, administrators or parents for outstanding service and/or professional competencies:** frequency of.

**Rating scales and check lists (e.g., graphic rating scales or the semantic differential)** of operationally-stated dimensions of teachers' behaviors in the classroom or of administrators' behaviors in the school setting from which observers may formulate inferences regarding changes of behavior that reflect what are judged to be desirable gains in professional competence, skills, attitudes, adjustment, interests, and work efficiency; the perceptions of various members of the total school community (parents, teachers, administrators, counselors, students, and classified employees) of the behaviors of other members may also be obtained and compared.

**Records and reporting procedures practiced by administrators, counselors and teachers:** judgments of adequacy by outside consultants.

**Termination:** frequency of voluntary or involuntary resignation or dismissals of school personnel.

Transfers: frequency of requests of teachers to move from one school to another.

V. Indicators of Community Behaviors in Relation to the Evaluation of School Programs

Alumni participation: numbers of visitations, extent of involvement in PTA activities, amount of support of a tangible (financial) or a service nature to a continuing school program or activity.

Attendance at special school events, at meetings of the board of education, or at other group activities by parents: frequency of.

Conferences of parent-teacher, parent-counselor, parent-administrator sought by parents: frequency of request.

Conferences of the same type sought and initiated by school personnel: frequency of requests and record of appointments kept by parents.

Interview responses amenable to classification and quantification.

Letters (mail): frequency of requests for information, materials, and servicing.

Letters: frequency of praiseworthy or critical comments about school programs and services and about the personnel participating in them.

Participant analysis of alumni: determination of locale of graduates, occupation, affiliation with particular institutions, or outside agencies.

Parental response to letters and report cards upon written or oral request by school personnel: frequency of compliance by parents.

Telephone calls from parents, alumni, and from personnel in communications media (e.g., newspaper reporters): frequency, duration, and quantifiable judgments about statements monitored from telephone conversations.

Transportation requests: frequency of.

# PRODUCT EVALUATION WORKSHEET #1

PROGRAM: IN-SERVICE, PART A

SUB-OBJECTIVES	CRITERIA (ACCEPTABLE EVIDENCE)	INFORMATION NEEDED/SOURCE	INSTRUMENTS
1. TO PRESENT FIVE TRAINING COURSES WHICH UTILIZE THE FIVE LEVELS OF CURRICULUM MATERIALS BEING DEVELOPED	CONTENT VALIDITY OF TRAINING COURSE (RELATED TO LEVELS OF CURRICULUM MATERIALS) INSTRUCTOR'S ADHERENCE TO PRESCRIBED CONTENT	CONSULTANT OPINION OF CONTENT VALIDITY--CONSULTANT TEACHER REPORT OF COURSE CONTENT--TEACHERS	CONSULTANT REPORT INTERVIEW SCHEDULE
2. TO FAMILIARIZE TEACHERS WITH THE CURRICULUM MATERIALS IN SPACE-RELATED SCIENCE	OBTAIN 95% REPEAT ATTENDANCE COVER ENTIRE UNIT IN 6 HOURS	INDIVIDUAL ATTENDANCE IN SESSIONS--ROLLS LECTURE COMPLETENESS OPINION--LECTURER	ROLL CARD FOR SESSIONS INTERVIEW SCHEDULE
3. TO DEMONSTRATE THE USE OF THE INQUIRY APPROACH WITH THESE CURRICULUM MATERIALS	MINIMUM USE OF ONE DEMONSTRATION FOR EACH UNIT AT EACH LEVEL OF CURRICULUM MATERIALS	RECORDING OF INSTRUCTION AUDIO TAPE RECORDING	AUDIO TAPE RECORDER
4. TO FAMILIARIZE TEACHERS WITH AVAILABLE SERVICES, MATERIALS, AND EQUIPMENT WHICH MIGHT BE USED IN THE SPACE-RELATED SCIENCE PROGRAM	ABILITY TO DEAL WITH HYPOTHETICAL SITUATIONS BY OBTAINING RESOURCES; EXPRESSED KNOWLEDGE ABOUT SERVICES, EQUIPMENT, AND MATERIALS	TEACHER SOLUTION--TEACHER TEACHER EXPRESSED KNOWLEDGE--TEACHER	HYPOTHETICAL EXPOSITION OF SITUATION AND RESPONSE FORMAT; QUESTIONNAIRE FORM
5. TO GENERATE TEACHER INTEREST AND ENTHUSIASM IN THE ADOPTION OF THESE CURRICULUM MATERIALS	POSITIVE CHANGE IN TEACHER ATTITUDES LEVEL OF USE OF CURRICULUM MATERIALS (75% OF TEACHERS TEACH 1/2 OF THE CONCEPTS IN MATERIALS DURING YEAR)	TEACHER ATTITUDE--TEACHER OBSERVATION OF INDIVIDUAL TEACHER USE--OBSERVER	SEMANTIC DIFFERENTIAL OBSERVATION SCHEDULE

# REPORT FORM/AUDIENCE

## ADMINISTRATION

1. HIRE CONSULTANT, SCHEDULE  
REPORT DEADLINE  
SCHEDULE AND CONDUCT  
INTERVIEWS

2. SET UP ROLL CARD  
CHECK TELEPHONE INTER-  
VIEW AND RECORD

3. SET UP RECORDER, PRINT  
CODING FORMS, SET  
REPORT DEADLINE

4. SCHEDULE AND ADMINISTER  
INSTRUMENTS TO TEACHERS

5. SCHEDULE PRE- AND POST-  
TEST AND ADMINISTER  
PROVIDE OBSERVER, PRINT  
CODING FORMS, SET REPORT  
DEADLINE

FREQUENCY COUNT BY INDIVID-  
UALS REPEATING SESSIONS--  
HUMAN COMPUTATION  
CONTENT ANALYSIS--HUMAN  
ANALYSIS (CONCEPTUAL)

TRANSCRIPTION: CODE TEACHER  
VERBAL PRESENTATION FOR  
INQUIRY BEHAVIOR--CODER

CORRECT-INCORRECT SOLUTIONS  
(DIFFERENCE SCORE) --HUMAN  
COMPUTATION  
SCORE FOR ACCURACY

ANALYSIS OF GAIN SCORES--  
COMPUTER PROGRAM  
FREQUENCY COUNTS OB USE  
BY TEACHERS--OBSERVERS

## SELECTED REFERENCES IN EVALUATION

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In July of 1967, you accepted a position as a secondary-school science supervisor. During your first week on the job, you discovered that the district Curriculum Study Committee on Goals for the Sciences had formulated a new set of educational goals. The superintendent of schools asked each science supervisor to analyze existing curricula within his area of responsibility and to design, implement, and evaluate pilot curricula. Based on the results, recommendations were to be made concerning possible system-wide adoption of these curricula.

You decided to focus initially on the biology curriculum. During the course of the year, you found that the following decisions had to be made in order to fulfill your charge:

1. Does the superintendent really want curricula to conform to the prescribed "Goals for the Sciences"? (i.e., what are the goals he really wants to attain?)
2. Does the selected set of goals really address itself to problems and needs in your system?
3. What are the goals of the present biology curriculum?
4. How much divergence is there between the "new goals" and the present goals of the biology curriculum?
5. What should the objectives of the biology curriculum be?
6. Can we attain all of these objectives?
7. How can we attain the objectives we have selected?
8. What portions of the present biology curriculum are relevant?
9. What alternative curriculum approaches might be used?
10. What are the benefits and costs of each alternative?
11. What criteria should we use in selecting from among the alternatives?
12. Which alternative biology curriculum is best suited to our needs?
13. Does operation of the selected curriculum create unforeseen procedural problems?
14. Are the teachers able to teach the biology curriculum which is implemented?
15. Does the selected biology curriculum yield the desired result -- i.e., does it attain the stated objectives?

The above decisions are listed in the sequence in which they had to be made. Group these decisions into the four categories of decisions (planning, programing, implementing, and consequential) by drawing heavy lines at appropriate points to separate the decisions in the list into four groups. Label each group according to type of decision.

You have recently been hired to aid the science supervisor, who unsuccessfully attempted to develop and evaluate a pilot curriculum in biology. Together you successfully culminated that task.

In view of the difficulty in accomplishing the prior task, you and the supervisor have attempted to anticipate the decisions which must be made as you engage in similar analysis of the physics program. Through communication with administrators and instructional staff, you have identified and compiled a list of decisions for which evaluative information is needed. This list follows:

1. What is the effect of participating teacher attitude on the new program?
2. What means are available which will likely reduce the cost of material development for the curriculum?
3. What similar types of new programs have other school systems attempted to implement?
4. What level of academic achievement would we have expected in physics?
5. Has student perception of the laboratory instructor affected new program operation?
6. How might the sessions in the curriculum best be presented sequentially?
7. Who among the students might most profitably be focused upon in this new program?
8. To what degree does the proposed program appear likely to be administratively feasible for physics teachers to operate?
9. What alternative interpretations exist for explaining the low level of understanding of physics concepts before we begin any new programs?
10. How will the proposed curriculum likely benefit students not enrolled in it?
11. What type of attitude toward the "discovery" method should students manifest?
12. Are students enrolled in the new program given the allotted individual counseling time by faculty members?
13. What are the benefits of the program--what objectives have been attained?
14. What is the current status of the problem which motivated our creating this new physics program?

15. What aspects of the in-service program for teachers of physics ought to be continued during the next year?

The decisions listed above are not listed in sequence -- i.e., they are not listed in the order in which they must occur for efficient program development. As before, your task is to categorize each decision by type (planning, programing, implementing, and consequential). Label each decision.

Because of your background in evaluation, you recognize that there is a direct relationship between the type of decision to be made and the type of evaluation (context, input, process, and product) needed to aid the decision-maker.

## SIMULATED EVALUATION DESIGN PROBLEM

The enclosed is the first of several sets of simulated materials which will be given to you as part of a simulated evaluation design problem in science education. This simulation is based in part on an actual ESEA Title III science project

However, much of the simulation material is totally fictitious. Many of the events portrayed herein never actually occurred. Names are fictitious, and many roles and behaviors are complete fabrications. In short, while an attempt has been made to lend an air of reality to the simulation by basing it on a real program, gross liberties have been taken in order to protect anonymity and to enhance the utility of the simulation.

The following agencies have kindly allowed the use of their "letterheads" to simulate correspondence related to the simulated project:

It should be stressed that all correspondence printed on these letterheads for this institute is simulated and bears no direct relation to any actual correspondence from any of these agencies.

As of now, you are E. Val Laytor, new Evaluation Specialist

~~\_\_\_\_\_~~ You have just arrived at your office for the first time, having only recently left your former position as a science supervisor in a neighboring district.

The materials attached here were left on your desk by Dr. Judd Mentle, former incumbent in this position. Unfortunately, you were unable to have a personal conference with him before he left for his new job. We suggest that you study carefully the materials which he left for you. You may need or want other specific kinds of information. If so, ask your secretary, Miss Rhea Sorse, and she can tell you whether or not such information is available. [The simulation instructors will play the role of Miss Sorse -- address any information requests to them.]

BAC 1.0

June 25, 1967

MEMO:

TO: Dr. E. Val Laytor

FROM: Dr. Judd Mentle

RE: Attached materials

I regret that I have to leave before you arrive to replace me. I had hoped to be able to introduce you personally to some of the problems you will face as you assume the position of evaluation specialist. You'll arrive at a critical time. The district has been under fire from several sources, particularly from a vocal citizens' group that feels we are "behind the times."

This spring, the board of education asked Superintendent McBride to organize a curriculum study committee to see if the district might analyze the report on "Regional Educational Goals for the 1980's" prepared by AEL (Appalachia Educational Laboratory, Inc.). A committee (they've given themselves the fancy title of "Goals Task Force") was formed and is working on recommendations now. If my guess is correct, they will have us changing everything in the system. If that happens, you'll probably wish you'd stayed in Huntington!

Supt. McBride was very strong with me on one point. Maybe you won't relate to him in the same way, but he made it clear to me that he was the decision-maker and my role was only to provide him with the information he asked for.

If you get in trouble, rely on Miss Sorse. She is the best secretary I ever had. And she really knows the school system. I've had her collect some background information I thought you might find useful. The first piece is a section out of an unsuccessful Title I proposal we submitted. It will give you a quick idea of what the system is like. The rest of this stuff is self-explanatory.

Good luck to you.

D-31

BAC 1.1

## TITLE I PROPOSAL

### The Community Setting

There are striking and extreme contrasts which are apparent in the educational and cultural needs of the citizens. At one end of the spectrum are the professional and technical personnel who make up thirteen per cent of the work force. These citizens desire for themselves and their families the highest quality in educational and cultural opportunities. They participate in and support the efforts of many community organizations. (However, a Museum, Scouts, Campfire Girls, and kindred groups are the only community-supported organizations that offer enrichment programs to the community as a whole.) On the other end of this spectrum are communities so remote that their peoples can spend whole lifetimes without ever leaving. These citizens have few, if any, desires for education or culture. The local one or two room school often represented the only culture and education they knew. Since it has been necessary to close all but a few of these schools through a program of consolidation, many communities have no cultural or educational influence remaining in their community lives.

average of \$483. Such a low expenditure cannot allow the inclusion of needed enrichment programs and activities for either the culturally deprived or highly gifted students, both of which are found within the school system.

An estimated 6% of the four and five year old children in the county participate in public school kindergarten or pre-school programs conducted with ESEA Title I and Operation Headstart funds.

The elementary classroom teacher to pupils ratio is 29:1. The secondary ratio is 22:1.

The elementary professional staff to pupils ratio is 25:1. The secondary ratio is 19:2.

The total enrollment in the school system over the past five years is as follows:

1963-64	-	60,010
1964-65	-	59,709
1965-66	-	59,664
1966-67	-	58,768
projected 1967-68	-	57,559

These figures show a decreasing enrollment pattern which reflects to some extent the 7% state population loss noted in the 1960 census. No other major changes in enrollment have occurred.

School facilities are not seriously overcrowded, and the current \$31,900,000.00 building program, to be completed in 1971, will further improve school facilities. None of the 156 schools have been declared unsafe.

is presently supporting the public schools at the maximum tax rate allowed by the State Constitution. The County is fully bonded (including a \$22,900,000 bond issue voted in 1965 for capital improvements and a supplementary bond issue of \$9,000,000 which was approved December 16, 1967) and the citizens have voted a 100% excess levy. The monies derived from the

excess levy are primarily used for instructional materials and to pay higher teachers' salaries. But salaries are still well below the national average.

The only avenue remaining to increase local support of the public schools is through increased property evaluation. The present evaluation of real and personal property is at approximately 50% of true and actual value, which is the amount required by State law. Recently a group of influential citizens representing industry, business and the general public met to discuss the need for more adequate school financing. They voted to take the necessary steps to cause property evaluation in the county to be raised over the next two to five years.

The county qualifies for assistance under the federally affected areas legislation. At present, no monies have been received, but full application for them is being made during the coming fiscal year.

from The Shiloh Times-Dispatch, March 1, 1967:

## NOTED PHYSICIST TO ADDRESS LOCAL SCHOOL OFFICIALS TODAY

MARCH 1 -- The noted physicist Dr. Charles Isaiah, Director of the Educational Studies Center of the University of Chicago, will speak today on "Technology, Space, and the Man of the Next Century" before a group of local educators. Dr. Isaiah is an outspoken advocate of redirecting and remaking the academic curriculum in today's secondary schools. Mr. Moore of the Board of Education invited Dr. Isaiah after hearing his comments on the report "Regional Educational Goals for the 1980's." Mr. Moore stated he "hoped Dr. Isaiah would give our local schools the direction which can come only from an expert involved in both an academic area and the field of education in general."

## MINUTES

The February 16, 1967 meeting of the Board of Education was held in the basement of the Administration building from 7 to 10 o'clock; all members were present. Mr. Gidney began the meeting by a call for tabling the agenda in order to permit open discussion of the report "Regional Educational Goals for the 1980's," prepared by the Appalachia Educational Laboratory. It was Mr. Gidney's belief that community reaction to the report's contents and spirit had been so deep and widespread that Board discussion was warranted. The motion passed.

Chairman Moore stated he was certain that all present recognized the opportunities for action in the future which were implicit in the report. He noted that the local reaction to the report would, in his opinion, be most valuable if undertaken in the spirit which surrounded the passage of the federal Elementary and Secondary Education Act of 1965 (especially as expressed in Title III).

Mrs. Merriman observed that she had received many "creative suggestions" from close friends among the membership of the PTA; she believed that many of these ideas (especially concerning cultural enrichment in the Art Museum or the use of honors programs) might be fruitfully investigated by the Board or the school administration.

Mr. Wallbrown differed with Mrs. Merriman, noting that "many of the Board's constituents" were less articulate than members of the PTA but had problems perhaps more severe and wants just as strongly perceived as did students with whom Mrs. Merriman was acquainted. Several teachers in the audience stated that they believed remedying shortcomings in the existing program (notably by "updating" the academic program at the secondary level) would be a more profitable undertaking than "trying to solve the problems of students who are not born yet."

James Wagner suggested that the Board solicit recommendations from the administration and the community concerning steps which might be taken to respond to the challenges implicit in the Goals report. Chairman Moore put the suggestion in the form of a motion and the motion passed unanimously. He directed the secretary to circulate the minutes of this meeting to interested parties as a solicitation.

Respectfully submitted,  
Janet Baker, Secretary

BAC 1.4

Dear Sh. Taylor,

It was a pleasure to chat with you at our faculty luncheon yesterday. I'm pleased to have you aboard.

I'm attaching some items which have crossed my desk recently. They all relate in one way or another to the work of the Goals Task Force, as you know, I'll have to move on that one before long. Could you help me by culling through this stuff and helping me identify decisions I will have to make and information sources that I can use in acting on the task force recommendations, when they are finally made.

I'm particularly concerned about the relationship of AET's "Regional Goals for the 1980s" to the unique needs and problems of our system.

Could you get your rough ideas to me sometime next week.

Thanks,

Phillip McBride

May 20, 1967

To the Members of the Board of Education

Amidst all the concern for planning for the 1980's, the school district must not overlook the wise use of available resources during present days. The importance of integrating existing programs is equally as great as the importance of coordinating the development of new programs. For these reasons, we believe it is crucial to report to the Board on the operation of the program in the Planetarium

There presently is little or no relation between use of the Planetarium by school personnel and students, and activities in the classroom prior to or after visits to the Planetarium. Yet the Planetarium appears to be viewed by school personnel as a valuable resource. There has been constant growth in the use of the facility, and a corresponding growth in the level of experience available to the visiting student.

Prior to November, 1962, the facilities of The Children's Museum were housed in three rooms. One of these rooms held a Spitz Model A-1 planetarium projector and canvas dome where public lectures were given once a week and school lectures by appointment. This Planetarium was operated by volunteers under the supervision of a semi-professional museum director.

During 1962, a move to larger quarters enabled the Museum's Board of Directors to plan for a larger, better-equipped Planetarium. A capital fund drive was conducted and the sum of \$35,000 was raised. A Spitz Model A-3-P projector, 20 foot perforated aluminum dome, reclined seating for sixty persons, and basic auxiliary equipment were purchased and installed. A small exhibit area adjoining the Planetarium was furnished with astronomical displays. The program was placed under the direction of a Museum Board member with amateur experience in the field, assisted by volunteer lecturers.

To the Members of the Board of Education

Page 2  
May 20, 1967

In 1964 the Museum Board asked the Schools to provide a teacher to serve as director of the Planetarium. Superintendent McBride expressed interest in coordinating a planetarium instruction with the regular school curriculum. However, funds were not available at that time nor in the foreseeable future to provide a teacher-director. Subsequently, the Museum employed a part-time, non-professional curator to supervise the Planetarium's operation and develop a specific program of lectures with the assistance of the science supervisors. One presentation for the primary grades has been completed to date, as well as an outline of the subjects to be covered by presentations for the higher grade levels.

Adjacent counties frequently send students to Planetarium. During 1965-66, there were approximately 1,500 student visitors from adjacent counties attending in class groups. In addition, class groups from more remote counties amounted to about 1,450 student visitors. Little has been done, however, to integrate the use of the Planetarium into the curriculum of the schools. A trip to the Planetarium is viewed as a field trip--an enriching, but not a teaching, experience. How can the schools plan profitably for the 1980's when the attitude of school personnel is to so wastefully misuse existing resources? We are willing to work with the school system, and especially its science supervisors, in creating an integrated program for Planetarium use; indeed, the availability of ESEA Title III funds makes such a proposal practically an expense-free risk. Would it not be more rational to work toward the educational goals of the 1960's, before worrying about the 1980's?

Sincerely yours,

*George DeSivius*  
*Janice Schmidt*  
*Henrietta Strickland*

Board of Directors

Task 1.1

PROGRAM ON COMMUNITY ACTION  
FOR TODAY'S YOUTH  
AND TOMORROW'S CITIZENRY

June 9, 1967

MEMORANDUM

TO: The Board of Education

RE: Solicitation of Reaction to "Regional Educational Goals For  
The 1980's"

In spite of the fact that [redacted] is a major industrial complex and that average local family incomes are among the nation's highest, cultural deprivation, provincialism, and poverty are widespread. There are extreme contrasts evident among students, families, and communities in the [redacted] valley region. While industrial wages (a major part of the region's economic base) in the region rank fourth highest in the country, and per capita income is ranked high by comparison to the national average, twenty-one per cent of the region's families subsist on incomes of less than \$3,000. There is no room among this latter group for the purchase of cultural or educational opportunities; all that is available to them are opportunities presented by the public school system, other government agencies, or private welfare agencies or charities. Most certainly you must not forget the youth of these families as you look at the "average" student of [redacted]

Gertrude Henry, Chairman

Sandra Raley

Erwin McAuly

Wilfred Sanders

Charles Bloom

Youth Committee, Inc.

D-40

Task 1.2

INDUSTRIALIST'S ASSOCIATION

Office of the Director

April 4, 1967

Dr. Philip McBride, Supt.

Dear Phil:

Just a short note to give you a rundown on the meeting we had over lunch today. Al Herbst had just seen the Regional Goals report, and was really excited by possibilities he saw in it for action by the school district. What would you say to running a "Science and the World of Work" program through the grades using work-oriented science materials, and having an adult education program in conjunction with that program which we would run in the assembly centers of our plants. You could relate simple and complex principles in biology, chemistry, and physics to illustrate the operating technology of industry in the area, and use our equipment, facilities, and other resources to complement your science program. It seems to me, as it did to Al, that a curriculum like this would really meet the changing needs of kids in our region for an understanding and appreciation of both science and technology.

A program like this would work into the program changes which you are undertaking (I understand), and also could advance the level of skill which our employees (both present and future) bring to the job. Of course, we'd be glad to work over coffee with you and your staff on this, and give some thought to providing books and perhaps some additional money for the program. I told Al, "This is the kind of thinking that can make this region great!"

Sincerely yours,

*Don Chambers*

MEMORANDUM

Supt. Mc Bride:

I'm sure you've seen this. It makes more sense to me than some of the other suggestions I've heard. Let me know what you intend to do--or has the Cook Task Force recommendation come out yet? I'm a bit worried about our financial ability to be very responsive to any expensive program.

Dennis O'Harrow

TASK 1.4

June 17, 1967

MEMO:

TO: Members of the Central Administration and the Science  
Department Faculty

FROM: Ray Boroff and Peggy Bresnen, Science Study Committee  
Co-Chairmen

RE: Suggestions for an Integrated Science Program to Meet the  
Needs of District Students

Considerable interest has been aroused by the report "Regional Educational Goals for the 1980's." The report has identified changes in the population and economic characteristics of the region likely to occur by 1990, and discussed implications of such changes for education and the impact of education on these characteristics. What stands out most clearly to us is a theme, recurring in the report, of the probable misuse of human and material resources in the region. Persons young and old will be underemployed, undereducated, and unprepared to meet the changing stresses of the coming years. The countryside will be more and more polluted. Workplaces will often be marginal economic undertakings, little understood and likely to be perpetuated in the region, greatly affecting an unsuspecting population.

In a time of change, in a region where the quality of human and material resources is frighteningly low, it seems that the most flexible and effective response to new needs that our system can make is to produce healthy and adaptable people. Young and old need proper nutrition, proper dental hygiene, reasonable personal health habits, and positive personal mental health, to be ready to adapt. In addition, a knowledge of the capability of people to adapt and their biological and physical environment is a necessary requisite for making successful and lasting adaptations. Finally, a knowledge of processes which make the human system and the ecological system operate as they do is a necessary requisite for operating successful adaptation, both personal and social.

TO: Members of the Central Administration and  
the Science Department Faculty

Page 2  
June 17, 1967

It is our belief that an integrated science program can meet the most pressing need of our region in the coming years--the need to know and understand the process and product of adaptation. Biological constructs, physics concepts, principles of chemistry and the earth sciences can all be used to instruct the student and give him understanding, and can all be related to the student's person, his life style, and the environment in which he lives. It is our belief that the science faculty ought to move forward to propose and plan a science curriculum which will help our students adapt, and which will have meaning for them. A unique opportunity for meeting the real needs of our students lies within reach. What is your reaction? Will you work with us on such a program?

Task 1.4

Contents of  
Student Cumulative Record  
Folder

1. Student Name, Address, Telephone, Parents' Names
2. Birthdate, Sex
3. Parents' Occupation, Education (years completed)
4. Brothers and Sisters Presently Enrolled in System
5. Grade Average in Subjects by Year, and Teacher
6. IQ Scores (California Test of Mental Maturity)--grades 6, 10
7. Standardized Achievement Test Scores

Stanford Achievement Battery grades 3, 6, 9, 11  
Sequential Tests of Educational Progress grades 3, 6, 9, 11  
Tests of General Educational Development (graduating  
senior, 1966 only; subtests in grammar, literature,  
mathematics, social studies, natural sciences)

8. Attitude toward various academic subjects (on locally-constructed semantic differential instrument)--grades 7, 10, 12 in 1966 only)
9. Individual test results and referral records of the school psychologist
10. Health record and referral records of the school nurse
11. Attendance (days per semester) for each year
12. Vocational Interest Checklist--grade 9 only

INFO 1

## SCIENCE ACHIEVEMENT

1966-67

1. Throughout standardized testing is done in grades three, six, nine and eleven, as a part of the State-County Testing Program.
2. In grades three and six the Stanford Achievement Battery is used and in grades nine and eleven the Sequential Tests of Educational Progress are used.
3. According to the most recent test data the number of students making exceptionally high and exceptionally low scores in science is as follows:

GRADE	NUMBER OF STUDENTS SCORING ABOVE THE 90th PERCENTILE (NATIONAL NORMS)	NUMBER OF STUDENTS SCORING BELOW THE 10th PERCENTILE (NATIONAL NORMS)	NUMBER OF STUDENTS TESTED IN EACH GRADE
3	623	573	5096
6	619	775	4838
9	584	307	4891
11	371	292	4169

INFO 1.

July 21, 1967

Dear Dr. Laytor:

I'm again being innundated with requests--by well-meaning people, I'm sure--for meetings with persons who have the solution to problems here in the district. A great number of people have been motivated to react to the Regional Goals report. I'd like to react to ~~pep~~ people's suggestions and requests with as much consistency as I can, and I'd like to have you do some work to aid me in achieving this consistency. From the materials I've given to you over the past days, would you pull together a set of possible objectives for district action which relate to needs and problems you've perceived. Of course, I'll want information on the degree to which any objectives you suggest are presently being attained. Could you, then, give me a list of likely ~~source~~ sources of information for this task, (i.e.- information to see if we've already attained them) relative to each objective you identify?

I'll check with you Friday on your progress.

Yours truly,

*Phillip McB*

Phillip McBride  
Superintendent

Task 2.0

August 1, 1967

Dear Val:

Your activities as an evaluator for this past month have been extremely helpful to me. Now I'd like you to give me your critical judgment on a job I must complete. The Goals Task Force has completed a report on objectives which they feel meet the most pressing need of the district. The objectives deal with a space-related science and planetarium program (I've attached their report).

I need you to help me make a program proposal out of these ideas, for the consideration of the School Board. The Board has decided the Task Force's ideas are good, and several Board members are pressing me to produce a Title III proposal based on the attached objectives. I'd like to make a feasible, as well as a relevant, program--lately everyone seems concerned about all the abortive attempts at change we've seen in the past. What I'd like you to do is select or screen from among the attached materials the most feasible objectives for the total program.

Thanks!

McB.

Task 3.0

MEMO: The School System

TO: All Science Faculty Members

FROM: Goals Task Force

RE: Statement of Need in the Region

Young people today are maturing in a world where the sum total of knowledge will double in one decade. This "explosion of knowledge" is recognized as a force affecting each of our lives in the last half of the 20th century. It is also recognized that a major focus of this knowledge explosion is space-related science, and that new concepts and technological developments in this area not only extend the limits of our environment, but also effect changes in its very nature. Thus we are living in the Space Age and must seek to understand what implications it has for us as individuals and as members of the community. There are economic, sociological, and political considerations; a new philosophical orientation is needed; even the art forms of our day reflect Space Age influence; to say nothing of the vast array of scientific and technological advances that both improve and complicate our lives. There are few areas of thought in either the sciences or the humanities which have not felt the impact of the Space Age. All of which poses a basic problem for the educational systems of our nation. They must provide young people with the knowledge and attitudes that will enable them to mature adequately and become effective citizens in this age of Space and space-related science.

A curriculum in astronomy and space science was written in the summer of 1966 for grades K through 6. It presently is being tested in thirteen classrooms in the county. During the summer of 1967, it should be evaluated and revised for expansion to other parts of the system. Curriculum writing in space-related science is scheduled for the secondary level during the summer of 1967. The limited funds available for both of these endeavors, however, does not allow for assistance by specialists in space-related science curriculum. The curriculum places little or no formal emphasis on the interrelatedness of space science to other science and non-science subject areas. Practically speaking, such emphasis has been a matter of individual teacher preference and ability.

An example of this lack of interrelatedness is the poor use of existing facilities. For example, during the past two years, ninety-four of the 122 elementary schools and seventeen of the thirty-four secondary schools have brought an average of four classes to visit the planetarium of The Museum. This indicates not only teacher interest in

providing further learning opportunities in the space-related science, but also some 888 hours of teaching time devoted to these opportunities. There is, however, only minimal coordination of the planetarium lecture content with the classroom curriculum, and the effectiveness of the visit depends solely on the ingenuity of the individual teacher to prepare his students for their learning experience and to reinforce it through follow-up classroom activities. In addition, the planetarium is staffed by amateur volunteers whose abilities vary tremendously.

County thus has a need and an opportunity to replace current deficiencies in the area of space-related science with a systematically structured program emphasizing not only the subject area, but also its relationship to other areas of instruction. The program, as proposed, deals with the needs for teacher in-service training in content and methods, curriculum development, and instructional materials; and stresses the involvement of students in the experiences of science.

#### Objectives to Meet the Local Need

The objectives of the pilot operation of the Space-related Science Project, we believe, ought to be the following:

A. To develop, during the summer of 1967, space-related science curriculum materials for grades K through 9 and to use these materials, during the 1967-68 school year, in a pilot program involving approximately ten per cent of the school population. The materials will emphasize the interrelatedness of Space Science to other subject areas and the involvement of students in the experiences of Science.

B. To coordinate the use of The Museum Planetarium with the space-related science curriculum materials and to improve its capabilities as an educational resource for the schools and the community.

C. To provide teacher in-service training in space-related science content and science teaching methods and materials through (1) a schedule of in-service courses for pilot teachers, and (2) Space-related Science Specialists whose responsibilities include giving maximum individual assistance to the pilot teachers.

D. To increase the learning opportunities in space-related science through the use of supplementary student activities which extend and enrich the curriculum.

E. To increase the availability of space-related science resource materials and equipment to pilot students and teachers.

F. To disseminate information about space-related science and the Project which encourages positive attitudes on the part of (1) principals, teachers, and other school personnel, (2) students and their parents, and (3) the community at large.

G. To maintain an awareness of new knowledge in space-related science and recently developed educational practices that may be of use in the ongoing Project.

H. To produce sample television programs in space-related science in cooperation with the area educational television broadcasting facility.

I. To gather data and to plan for the step-wise expansion of Project services and facilities.

J. To incorporate a continuing program of evaluation designed to assess the degree to which the above objectives are attained and to provide information necessary to the maintenance of Project effectiveness.

### Task 3.1

Aug. 4

Dear Dr. Layton:

Here are some estimates I've prepared in response to your phone request for my guesses about costs of the Title III project. I've looked at the proposal draft the Task Force prepared, and have worked out estimates for salaries, materials, equipment, etc. I doubt you can do the project for much less than I've listed.

Supt. Mc Bride used these estimates in preparing an estimated (tentative) budget which he sent to the State Coordinator of Title III programs -- probably as a trial balloon.

If there is any other information I can give you, feel free to give me a call.

Dennis O. Harrow

P.S. -- my full address is Finance Officer, Business

## PROPOSED BUDGET

<b>A. Administration</b>		<b>\$29,500</b>
Salaries (Project and Planetarium Director)	27,000	
Materials	1,500	
Travel	1,000	
<b>B. Instruction</b>		<b>91,500</b>
Salaries	48,500	
Science Specialists (3) @ 11,000		
Evaluation Specialist @ 11,500		
Secretary @ 4,000		
Materials	7,000	
Travel	7,000	
Consultants	4,000	
Stipends for materials development	23,000	
ETU Programming	1,000	
Dissemination	1,000	
<b>C. Planetarium Instruction</b>		<b>15,000</b>
Salaries	13,000	
Travel	1,500	
Consultants	500	
<b>D. Plant Operation (Planetarium)</b>		<b>1,500</b>
<b>E. Pupil Transportation</b>		<b>3,000</b>
<b>F. Equipment</b>		<b>9,000</b>
Office	3,000	
Planetarium	3,000	
Truck	3,000	
<b>G. Fixed Costs (Benefits)</b>		<b>8,000</b>
<b>Total</b>		<b>\$157,500</b>

August 9, 1967

Dr. Phillip McBride,  
Superintendent

Dear Dr. McBride:

Regarding the possibility of funding your proposed Title III program in astronomy and space-related science, I am concerned about the tentative budget you submitted. I have talked to your finance officer, Mr. Dennis O'Harrow, and informed him that the estimated cost of the first year of the pilot program -- \$158,000 -- is considerably higher than we customarily fund such programs. I suggested he seriously investigate the possibility of reducing the budget by approximately one-half, especially in view of the likely Federal cuts in domestic spending during the next fiscal year. I look forward to talking with you further as your project develops.

Cordially,

*Will Ketchum*

Will Ketchum, Auditor  
Office of Coordinator  
of Federal Programs

Task 3.3

D-54

MEMORANDUM

Dr Layton —

Here's the stuff out of  
the proposal that relates  
to the Task Force notions  
about what jobs each  
person on the project will  
do. I think you're right  
— they'll have to plan  
on working a 15-hour  
day!

Rhea

TASK 3.4

### Likely Tasks of Personnel

The Project Director will be responsible for the overall supervision and administration of Project activities; coordinate the curriculum writing conference; instruct in-service teacher training courses; coordinate study and evaluation programs and direct revisions and changes in Project operations; coordinate planning efforts and implement new procedures which are developed; supervise dissemination of information; prepare budget and exercise its control; supervise proper maintenance of records and preparation of reports and proposals; maintain liaison with government agencies (including state and federal Departments of Education); develop areas of cooperation between Project and other educational agencies and institutions; supervise development of educational television programming; supervise acquisition of Project library with accurate and up-to-date materials on space-related science information and science education practices.

The Planetarium Specialist will be responsible for the operation and maintenance of the planetarium facility; coordinate planetarium scheduling; assist Space-related Science Specialists in preparation of planetarium lessons for pilot operation; write and produce public planetarium programs; install and maintain auxiliary planetarium equipment; design and build new auxiliary equipment, as required; present or supervise the presentation of all public programs; disseminate information on planetarium programs to general public and to scheduled school groups; maintain accurate, timely knowledge of space-related science developments for incorporation in public programming; advise on public program and planetarium facility expansion; supervise acquisition of and maintain planetarium equipment, library of films, slides, auxiliaries, sound tapes, and other visual effects; prepare planetarium operating budget and supervise its expenditure; keep accurate records of planetarium use, operative checks and maintenance performed; assist in acquiring data on audience reaction to public programs.

The Space-related Science Specialists will be responsible for conducting in-service teacher training; provide maximum individual assistance to pilot classroom teachers in subject content, methods, and materials use; encourage and assist with supplementary student activities; arrange for and direct large group activities such as "Star Parties" and family programs; present three-part planetarium lessons (including pre-visit orientation and post-visit reinforcement); counsel and advise teachers in matters of scheduling and evaluation; disseminate Project information to pilot schools; assist in development of educational television programming; maintain accurate, timely knowledge of space-related science content and developments in science education; advise on expansion of program and educational planning; keep accurate records of Project activities as re-

226

quired by evaluation procedures; implement revisions in materials and procedures resulting from Project evaluation.

The Evaluator will be responsible for carrying out all the evaluation tasks of the Project; work with Project staff to explain evaluation techniques and outline record-keeping requirements; design and produce, schedule and administer evaluation instruments; observe and confer with a valid sample of pilot school personnel; supervise the processing and analysis of all data collected; make weekly reports to Project Director and monthly reports to planning groups and The Children's Museum on evaluation results; prepare year-end evaluation report for Project staff, Board of Education, state and federal Departments of Education.

#### Task 3.4

September 5, 1967

Dr. E. Val Laytor,  
Evaluation Specialist

Central Administration Building

Dear Val:

I don't know if you are in a position to do anything about it, but I'm going to complain to you anyway. I hope I'm not misusing our friendship.

I called McBride as soon as I heard about your district's decision to put all their eggs into that misbegotten Title III planetarium project. I told him that I couldn't conceive of a focus much less related to what we see as real needs in this area. But I guess he isn't going to listen.

Val, I'm really disturbed. We spent a lot of time and research on our report on "regional goals for the 1980's." We identified many problems that are crucial in Appalachia--and Charleston is no exception. We have hundreds of kids who can't read their names, and you guys decide to teach them about the stars! I just don't understand the logic. Can't you get to McBride and talk some sense to him? If I can help you convince him, let me know.

Sincerely,



Wayne Newton  
Research Director

MEMORANDUM

To: Phil McBride

late yesterday afternoon I got a call from Ray Broff, one of the chairman of the Science Study Committee. He said the secondary school science people are really upset about science specialists coming to work with them in the Planetarium program - they feel better qualified than the specialists. I'm sure they'll balk at having the program in grades 8-12. Better go slowly & we'll have them at contract time.

C. Moore

PS - What about a K-7 program?

INFO-3

August 12, 1967

Dear Val:

Thanks for doing such a thorough job of scrutinizing the proposed objectives for the Title III space-related science program. The over-all objectives the Board decided upon are attached.

The one objective I'm really concerned about is the one regarding in-service education. I'd like you to help me look at how we might best attain this objective. Would you set some criteria for selecting among alternative programs? Then, use your creativity and the criteria to generate alternative ways to attain the in-service education objective. Can you give me the criteria and a list of alternative programs (just one or two sentences describing the program, and a notation of the criteria which you expect the program to meet) by next Wednesday?

Thanks,

*McB.*

Phillip McBride  
Superintendent

PM:jt  
Task 4.0

## Objectives

The objectives of the first year pilot operation of the Space-related Science Project are:

A. To develop, during the summer of 1967, space-related science curriculum materials for grades K through 9 and to use these materials, during the 1967-68 school year, in a pilot program involving approximately ten per cent of the school population. The materials will emphasize the interrelatedness of Space Science to other subject areas\* and the involvement of students in the experiences of Science.

B. To coordinate the use of The Children's Museum Planetarium with the space-related science curriculum materials and to improve its capabilities as an educational resource for the schools and the community.

C. To provide teacher in-service training in space-related science content and science teaching methods and materials through (1) a schedule of in-service courses for pilot teachers, and (2) Space-related Science Specialists whose responsibilities include giving assistance to the pilot teachers.

D. To increase pilot teacher knowledge of the availability of space-related science resource materials and equipment.

E. To disseminate information about space-related science and the Project which encourages positive attitudes on the part of (1) principals, teachers, and other school personnel, and (2) students and their parents.

F. To maintain awareness of new knowledge in space-related science and recently developed educational practices that may be of use in the ongoing Project.

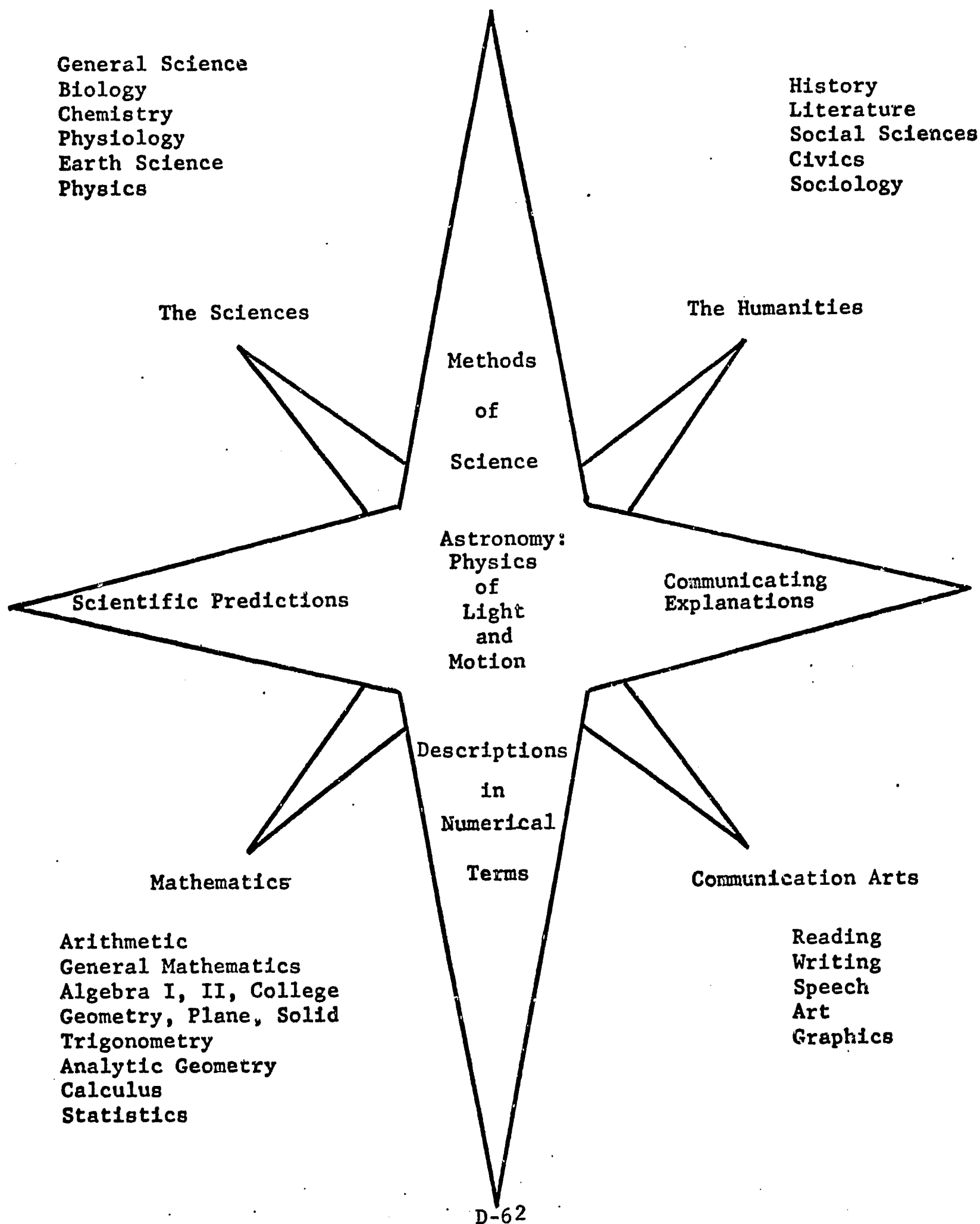
G. To gather data and to plan for the step-wise expansion of Project services and facilities.

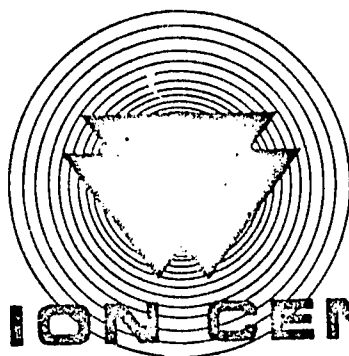
H. To incorporate a continuing program of evaluation designed to assess the degree to which the above objectives are attained and to provide information necessary to the maintenance of Project effectiveness.

\* See attached "Space-Related Science" diagram.

# SPACE-RELATED SCIENCE

EMBRACES MANY DISCIPLINES





## EVALUATION CENTER

College of Education

Dear Colleague in Evaluation:

I have recently been looking at the problems of educational planning and the assessment of alternative strategies for attaining goals which educators deem desirable. It seems to be true throughout education that there is little systematic comparison of ways to attain the objectives which local schools, whole districts, or larger systems state are of concern to them.

I believe that some ideas I have been working with might provide a framework within which the assessment of inputs might be viewed. The following are criteria which I have found help me evaluate alternatives; the criteria are vague, and may be used together or separately, with varying degrees of importance attached to them, but they help me appear more rational when reasonableness is needed.

### CRITERIA FOR EVALUATING ALTERNATIVE STRATEGIES FOR ATTAINING EDUCATIONAL OBJECTIVES:

- Relevance: determining the relevance of the proposed solution strategy to identified need areas;
- Legality: determining the legal status of the proposed solution relative to the context in which it is to be implemented;
- Congruence: determining the congruence of the solution with the value system(s) of the agency charged with implementation;
- Legitimacy: determining if the solution is within the purview of the agency charged with the implementation;
- Compatability: determining the compatability of the strategy with the value system(s) of the implementing agency and its staff;
- Balance: determining the impact of the solution on other components of the system of concern, and on the weights and interrelationships of the organization;
- Practicability: determining the practicability of the solution in terms of achieving its stated purposes (end products or outcomes);
- Cost-effectiveness: determining the relative desirability of the solution in comparison with other solutions, in terms of the ratio of necessary inputs (costs) and outputs (effectiveness).

My hope is you will use and revise them at will.

Sincerely,

*Michael S. Caldwell*

Michael S. Caldwell  
Associate Director

D-63

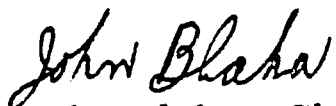
Dr. E. Val Layton  
Evaluation Specialist

Central Administration Building

Dear Dr. Layton:

I've had the members of the Goals Task Force work over the objective that you and Supt. McBride were concerned about. To make what we intended more apparent, we have restated the objective and articulated a set of sub-objectives. Our thinking was that we would assume the objective was attained when we could see evidence that the sub-objectives had been attained. I hope these ideas give you some lever on the job of creating different ways of going about attaining our in-service education objectives.

Yours truly,



John Blaha, Chairman  
Goals Task Force

Attachment

Task 4.2

Major and Minor Objectives of the In-Service Education Program: to provide teacher in-service training in space-related science content, methods, and materials (and to attain this objective through the following):

A) In-service courses for pilot program teachers (with sub-objectives being):

- 1) to present five training courses which utilize the five levels of curriculum materials being developed;
- 2) to familiarize teachers with the curriculum materials in space-related science;
- 3) to demonstrate the use of the inquiry approach with these curriculum materials;
- 4) to familiarize teachers with available services, materials, and equipment which might be used in the space-related science program;
- 5) to generate teacher interest and enthusiasm in the adoption of these curriculum materials.

B) Individual assistance provided by science specialists in the program (with sub-objectives being):

- 1) to answer teachers' subject matter inquiries;
- 2) to keep teachers informed of current developments in the subject-matter area of space-related science;
- 3) to provide resource equipment and materials on request;
- 4) to demonstrate inquiry teaching methods on request;
- 5) to engage in team teaching in space-related science on request
- 6) to assist with small-group investigations on request.

A period of several months' time has elapsed since you worked with designing alternative in-service education programs (in the previous simulation). During the past months the draft proposal was prepared in its final form and submitted, and a Title III grant received for establishing and operating a space-related science program. The objectives of the program are those with which you are familiar (and were listed in the previous simulation). The program is now well under way, having been started at the beginning of the school year. Your task is to monitor the operation of the program's activities and detect deviations from the manner in which the program was expected to operate. You have been monitoring potential barriers or sources of trouble which you predicted might impede program activities, as well as remaining alert to unanticipated barriers to program success. Periodically you have been sending reports to decision-makers responsible for the program. Then ---

#### Task 5.0

## PROCESS EVALUATION REPORT NO. 14

Project: In-Service Education

Program: Space-Related Science, Title III

Date: November 20, 1967

Data Collection and Report Preparation: E. Val Laytor

**SUBJECT:** Attendance at In-service Education Meetings

### Criterion:

Fluctuation in teacher attendance at in-service education meetings was one of the factors identified during project planning as a likely barrier to project success. It was believed that a serious drop in session attendance would make it unlikely that project objectives could be fully attained.

### Findings and Interpretation

During the past four meetings, there has been a marked and consistent downward shift in attendance. The following figures illustrate this:

<u>Meeting</u>	<u>Attendance</u>
1 (Oct. 27)	74
2 (Nov. 3)	63
3 (Nov. 10)	55
4 (Nov. 17)	46

Initially, 75 persons were expected at the sessions; it was anticipated that attendance would remain at that level. Thus, it appears unlikely that the desired level of teacher training will be achieved unless steps are taken to insure a high level of regular repeat attendance.

### Data Collection Organization and Analysis:

Session attendance was taken by counting entrants to the in-service training sessions. The evaluator recorded the actual attendance figures on a roll card, and checked project files to determine expected enrollments. Analysis involved comparison of expected and observed attendance by meeting.

MEMO:

FROM: Sally Richardson

Dear Teacher:

I am happy to hear that you have agreed to be one of the pilot teachers in the Space-Related Science Project. As you know, we will hold a special in-service course to provide training in space-related science content, methods, and materials.

The course will be held in the multi-purpose room at Fairview Elementary School on West Seneca Avenue. The instructor will be Mr. Willard Leer, the new Director of the Space-Related Science Project.

A schedule of the sessions and topics appears below. Each session meets for one hour.

October 27	Introduction to Space-related Science Curriculum Materials
November 3	Developing Student Investigations in Space-related Science
November 10	Techniques for Using Astronomical Equipment
November 17	Space-related Science and the Inquiry Approach
November 24	Space-related Science Curricula: Units 1-3
December 1	Space-related Science Curricula: Units 4-6

You've been so immersed in the many activities of an evaluator that you have completely overlooked beginning a job that you should have completed some time ago. You have not yet made a product evaluation design for either the program as a whole or any of its parts. This has been brought painfully to your attention by a reminder to you (in the hallway) from Supt. McBride, who observed he would soon be ready to "take a hard look at the in-service training program" to see if further programs ought to be conducted in the same way.

You've decided to begin the task by developing a product evaluation design for five sub-objectives of the in-service program. Having constructed the attached worksheet, your job now is to fill in the worksheet.

#### Task 6.0

Product Evaluation Worksheet #1

Program: In-Service, part A

Sub-objectives	Criteria (Acceptable Evidence)	Information Needed/Source	Instrumen
1. To present five training courses which utilize the five levels of curriculum materials being developed			
2. To familiarize teachers with the curriculum materials in space-related science			
3. To demonstrate the use of the inquiry approach with these curriculum materials			
4. To familiarize teachers with available services, materials, and equipment which might be used in the space-related science program			
5. To generate teacher interest and enthusiasm in the adoption of these curriculum materials			

D-70

ation  
Source      Instruments      Administration      Analyzing  
Information      Report  
Form/Audience

January 16, 1968

Dr. E. Val Laytor

Central Administration Building

Dear Dr. Laytor:

To respond to your request for information about what evidence the members of the Board would accept as indicative that program objectives have been met, I discussed the matters you listed with my colleagues. For each of the sub-objectives in the in-service training program, we talked over some of the possible types of evidence you suggested, and after due deliberation we decided the following represents evidence we would be comfortable accepting from others and defending to the public:

Objectives

Acceptable Evidence

1. To present five training courses which utilize the five levels of curriculum materials being developed

Content validity of the training course in relation to the level of curriculum materials discussed

Instructor adherence to prescribed content

2. To familiarize teachers with the curriculum materials in space-related science

95% repeat attendance at sessions

Coverage of the entire curriculum unit in the six hours of sessions

3. To demonstrate the use of the inquiry approach with these curriculum materials

Minimum of one use of method for each unit at each level of curriculum materials

4. To familiarize teachers with available services, materials, and equipment which might be used in the space-related science program

Ability to deal with hypothetical situations by obtaining relevant resources

Expressed knowledge about services, materials, and equipment

D-71

Dr. E. Val Laytor

-2-

January 16, 1968

Objectives

Acceptable Evidence

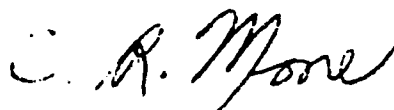
5. To generate teacher interest and enthusiasm in the adoption of these materials

Positive shift in teacher attitude

Teacher level of use or non-use of curriculum materials

If we may be of further help to you, please feel free to contact me. We look forward to reviewing your forthcoming reports concerning the impact of our district's Title III educational programs on the needs of this area.

Sincerely yours,



Chairman,  
County Board of Education

Task 6.2

January 18, 1968

Dr. E. Val Layton

Central Administration Building

Dear Dr. Layton:

I understand you're planning an evaluation of the space-related science program to assess the extent to which we got the payoffs we hoped for. I know evaluation is a difficult job, and I want to help you in any way I can. I'd be glad to discuss with you what the program has done; I've been with the program since it was funded, and am familiar with all aspects of it. It seems that it would be easier on teachers and staff members in the program, as well as more productive for you, to use materials I have here in the office and reactions and perceptions I've gotten from working with people in the program. If you'd find it helpful, I'll be glad to stop by and work with you.

Yours truly,



Willard Leer, Director

Task No. 6.3

You have finally completed the product evaluation design. The last major task facing you is that of drawing up a master schedule for the collection of the information (administration of instruments, etc.). Start by drawing up a master schedule for the data collection in the portion of the design which you have just completed (the product evaluation of the first five sub-objectives of the in-service training program).

**Task 7.0**

January 28, 1967

Dr. E. Val Laytor

Central Administration Building

Dear Val:

I've just received your note requesting a series of interviews with project personnel in the Title III space-related science program. Feel free to begin your work any time; there is no problem in interviewing these people. Your request reminded me of the problem we had with Judd Mental's scheduling of evaluation activities, when he was here as your predecessor -- and because of those problems I ought to fill you in on some general guidelines for testing, etc., here in the district. The following guidelines are the outgrowth of discussions between myself and staff of the district:

- a) Students may be tested only during the first two and last two weeks of the school year
- b) Teachers may be used as information sources only under their own volition
- c) Project personnel are required to provide evaluation information needed by the evaluator
- d) All other personnel may serve as information sources only after the matter is approved by the central administration.

I think it would be best to use these guidelines in setting up any further work you do.

Yours truly,



Phillip McBride, Supt.

D-75

Task 7.1

## SOME METHODS OF DATA COLLECTION

1. Objective tests
2. Essay tests
3. Projective methods
4. Rating scales, Check lists, Inventories
5. Semantic differential
6. Questionnaire
7. Interviews
8. Observation of behavior
9. Sociometry
10. Unobtrusive measures and content analysis

PRIMARY USES	STRENGTHS	WEAKNESSES
OBJECTIVE TESTS		
1. Measure individual's aptitude, achievement, and intelligence	1. Greater objectivity in scoring	1. Problem of validity
2. Screen and select individuals	2. Speed of scoring	2. Standardized tests sometimes used in institutions requiring specially constructed tests
	3. Potentially higher reliability	
	4. Can be item analyzed for improvement	
	5. Quantity of available standardized tests	
ESSAY TESTS		
Measure student ability to think, organize, and apply knowledge	Allows students to synthesize their knowledge about a topic	1. Difficult to score objectively
		2. Sampling of topics is relatively limited
PROJECTIVE METHODS		
Measure individual's emotions, needs, motivations, attitudes, and values through projected behavior	1. Clinically insightful	1. Lack of objectivity in interpretation
	2. Allows measurement of variables typically unavailable through other techniques	2. Uncertain reliability and validity

RATING SCALES, CHECK LISTS, INVENTORIES

PRIMARY USES	STRENGTHS	WEAKNESSES
1. Assess interests, vocational choices, personality	1. Easy to complete	1. Often interpreted too narrowly
2. Predict occupational success	2. Numerous items help increase reliability	2. Criteria for ratings are often unspecified
3. Measure system variables	3. Can be objectively scored	3. Often forces choices between unacceptable responses

D-78

EXAMPLE OF A  
RATING SCALE ITEM

Is this student shy or bold in social relationships?

Painfully self-conscious	Timid	Self-conscious on occasions	Confident in himself	Bold, insensitive to social feelings
(1)	(2)	(3)	(4)	(5)

## SEMANTIC DIFFERENTIAL

### PRIMARY USES

Assess respondent's attitudes on a topic through choices on bipolar adjective scales

### STRENGTHS

1. Adaptable to varying research demands
2. Quick and economical to administer and score

### WEAKNESSES

Often tells more about the respondent than about the topic under consideration

### INTERVIEWS

- |                             |  |   |
|-----------------------------|--|---|
| 1. Explore new fields       | 1. Allow depth and free response   | 1. Costly in time and personnel   |
| 2. Validate other methods   | 2. Flexible and adaptable to individual situations                                       | 2. Require skilled interviewers   |
| 3. Probe responses in depth | 3. Allow glimpse of respondent's gestures, tone of voice, etc., that reveal his feelings | 3. Often difficult to summarize   |
|                             |  | 4. Many biases possible, i.e., interviewer's, respondent's, situational |

### QUESTIONNAIRES

- |                           |  |   |
|---------------------------|--|---|
| 1. Survey large groups    | 1. Self-administered                         | 1. Frequent low percentage of returns   |
| 2. Validate other methods | 2. Anonymity can cause more honest responses | 2. No assurance that the intended respondent understands the questions            |
|                           | 3. Economical                                | 3. No assurance that the intended respondent actually completed the form himself. |

## PRIMARY USES

## STRENGTHS

## WEAKNESSES

### OBSERVATIONS OF BEHAVIOR

- |   |  |   |
|---|--|---|
| 1. Describe actions through direct observation              | 1. Can be used in natural or experimental settings | 1. Observer's presence often causes an artificial situation |
| 2. Measure interactions between persons in a social setting | 2. Most direct measure of behavior                 | 2. Hostility to being observed                              |
|   |  | 3. Problem in deciding exactly what is to be observed       |
|   |  | 4. Inadequate sampling of observed events                   |
|   |  | 5. Ambiguities in recording                                 |
|   |  | 6. Frequent observer unreliability                          |

### SOCIOMETRY

- |   |                          |   |
|---|--------------------------|---|
| 1. Analyze data on choices, communication, and interaction patterns of people in groups | 1. Easy to analyze       | Criteria used in making choices are often vague |
|   | 2. Naturalistic method   |   |
|   | 3. Clinically insightful |   |
| 2. Classify individuals and groups according to influence, leadership, etc.             |                          |   |

UNOBTRUSIVE MEASURES	
PRIMARY USES	WEAKNESSES
1. Validate more conventional measures	1. Hidden measures are considered unethical by some
2. Develop insights	2. Doubtful validity when used alone
3. Suggest hypotheses	
4. College data otherwise unobtainable	

EXAMPLES OF  
UNOBTRUSIVE MEASURES

1. Physical wear on certain pages of books to measure amount of use
2. Police and Juvenile Court records
3. Census data
4. Number of marks on the school walls
5. School budgets
6. Student cumulative records
7. Bulletin board displays
8. Completed teacher application forms
9. Teacher transfer rates
10. Hidden microphones or observations

EXAMPLE OF INTERVIEW  
OR QUESTIONNAIRE

1. In general, how would you rate the program of the health centers as a means of providing the necessary medical and dental care for low income students?

☐ Very good, no problems  
☐ Good, some problems  
☐ Inadequate, many problems  
☐ Very poor, does more harm than good  
☐ Other, please specify

2. Have you been able to visit the health center that serves your school?

☐ Yes                      ☐ No

If yes, are the physical facilities adequate?

☐ Yes                      ☐ No

If no, what is needed?

3. What problems, if any, do your children have in getting to the health center?

☐ Lack of transportation  
☐ Geographical location  
☐ Inability of parent to accompany child  
☐ Parental indifference  
☐ Poor home-school communications  
☐ Other, please specify

4. Have you been able to form a clear perception of your role in relation to the Health Centers Project?

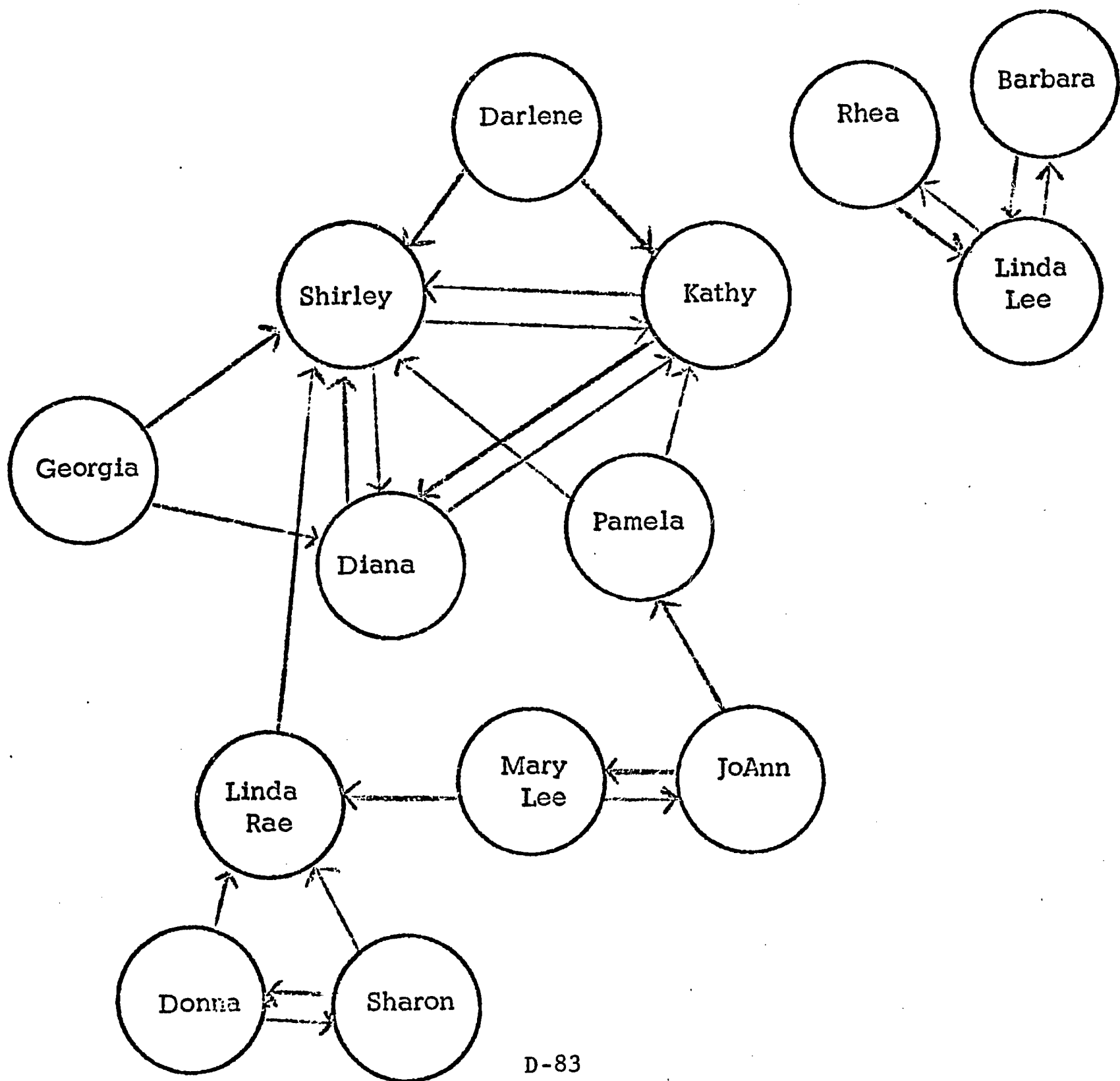
☐ Yes                      ☐ No

If yes, please describe this role. (Functions and responsibilities)

# EXAMPLE OF A SOCIOMETRIC ITEM

Write the names of the three children in the class you would most like to have sit near you.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



EXAMPLE OF  
CHECK LIST ITEMS

Please check those pieces of equipment which you frequently use in your science classes:

Record player \_\_\_\_\_  
Tape recorder \_\_\_\_\_  
Filmstrip projector \_\_\_\_\_  
Overhead projector \_\_\_\_\_  
Film projector \_\_\_\_\_

EXAMPLE OF  
INVENTORY ITEMS

1. Select from the three activities listed, the one that you would most like to perform:
  - a. Design new styles for automobiles
  - b. Conduct an advertising campaign for a particular make of car
  - c. Sell automobiles
2. I would rather (choose only one):
  - a. Burn my draft card
  - b. Deprive a baby of food
  - c. Steal money from a church

## SELECTED DATA COLLECTION METHODS

## INFORMATION NEEDS

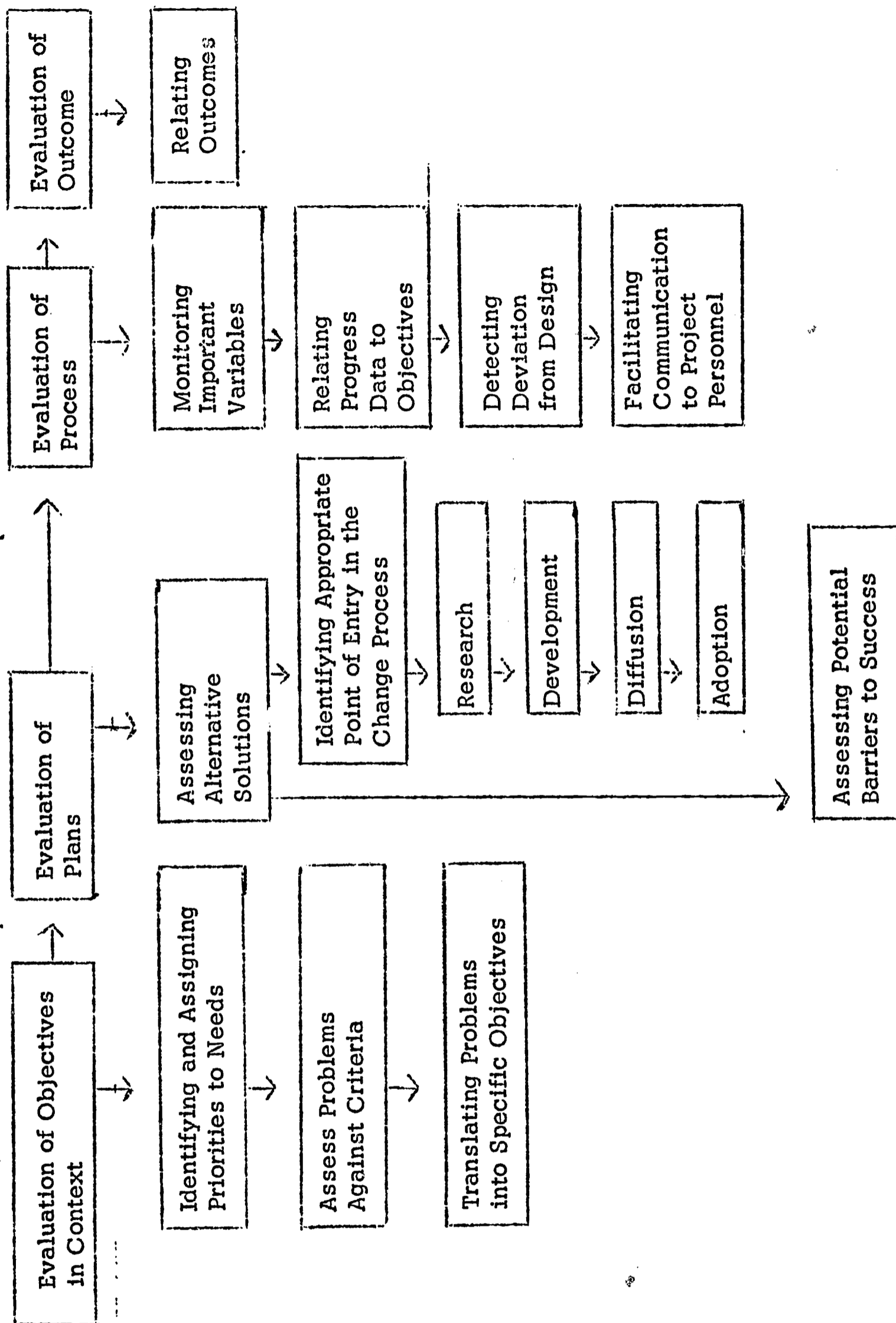
## A. PSYCHOLOGICAL VARIABLES

1. Intelligence
2. Aptitude
3. Achievement
4. Personality
5. Readiness
6. Sensory Motor
7. Vocational preference
8. Interest
9. Attitudes/Values
10. Motivation
11. Creativity

## B. SYSTEMS VARIABLES

1. Personnel
2. Finance
3. Facilities & materials
4. Communications
5. Structure
6. Influences
7. Content/systems output
8. Goals & objectives

[illegible]



APPENDIX TABLE 1

RESPONSES BY TEACHERS AND SUPERVISORS  
TO STATEMENTS ABOUT THE INSTITUTE

Item Number	Teachers					Supervisors					Total Group				
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
1.				6	4			1	29	33			1	35	27
2.				2	8			1	8	44			1	10	52
3.	6	4		1		28	20	3	2		34	24	3	3	
4.		1		8	2		1	2	27	22		2	2	35	24
5.		1	1	7	1	1	3	3	43	3	1	4	4	50	4
6.				10	1	1	1	3	38	10	1	1	3	48	11
7.			1	8				8	32	12			9	40	12
8.			1	5	5		2	5	25	20		2	6	30	25
9.			1	9	1	1	1	7	39	5	1	1	8	48	6
10.				10		1	2	8	35	6	1	2	8	45	6
11.			3	7	1		2	10	35	5		2	13	42	6
12.			1	9	1		2	10	35	5		2	11	44	6
13.				8	3			3	39	10			3	47	13
14.		1	2	6	2			8	42	2		1	10	48	4
15.				8	3		1		34	17		1		42	20
16.			2	6	3		1	8	36	7		1	10	42	10
17.			2	9			4	11	34	3		4	13	43	3
18.			1	10		1	6	9	19	16	1	6	10	29	16
19.			2	8	1	1	2	9	27	12	1	2	11	35	13
20.	2	4	3	1		7	22	16	6		9	26	19	7	
21.			2	7	2		1	5	29	17		1	7	36	19
22.	2	4	3	2		4	26	18	11	2	6	30	27	18	2
23.	2	7	2			9	28	13	2		11	35	15	2	
24.	2		2	5	2		3	13	33	4	2	3	15	38	6
25.	2	6	3			6	28	13	4	1	8	34	16	4	1
26.		5		4	1	11	29	6	5		11	34	6	9	1
27.	2	9				15	34	3			17	43	3		
28.	3	7	1			16	34	1	1		19	41	2	1	
29.				6	5	1		1	14	36	1	1	1	20	41
30.	2	3		6		3	11	4	24	10	5	14	4	30	10
31.	1	6	1	2	1	8	31	9	4		9	37	10	6	1
32.	4	6	1			9	28	7	5	2	13	34	8	5	2
33.			5	4	2			14	32	6			19	36	8
34.				6	5			1	23	28			1	29	33
35.	4	6	1			10	31	4	7		14	37	4	7	
36.	3	5	1	2		7	27	5	14		10	31	6	16	
37.		1	5	5		1	11	14	24	2	1	12	19	29	2
38.		1	1	7	1		2	18	27	4		3	19	34	5
39.				4	7			5	18	29			5	22	36
40.	2	6		3		6	28	13	3	1	8	34	13	6	1
41.	4	5		2		25	25		1	1	29	30		3	1
42.				5	6			1	25	25	1		1	30	31
43.	1	9	1			5	33	10	4		6	42	11	4	
44.		8	2		1	4	25	17	5	1	4	33	19	5	2
45.	1	5	4	1		6	29	6	7	4	7	34	10	8	4
46.			2	5	4			4	27	21			6	32	25

SD=strongly disagree; D=disagree; etc.

APPENDIX TABLE 2

EVALUATIONS BY TEACHERS AND SUPERVISORS  
OF SPECIFIC ACTIVITIES BY DAYS

Days	Teachers			Supervisors			Total Group		
	Too Much	About Right	Too Little	Too Much	About Right	Too Little	Too Much	About Right	Too Little
First Day									
1.		8		1	43	3	1	51	3
2.	2	5		4	38	9	6	43	9
3.		6	3	2	37	13	2	43	16
4.		4	4	3	21	28	3	25	32
Second Day									
1.	3	8		14	24	14	17	32	14
2.	1	3	7	10	19	23	11	22	30
3.	1	4	6	8	20	24	9	24	30
4.		2	8	8	16	28	8	18	36
5.		2	8	8	14	30	8	16	38
Third Day									
1.	2	9		3	44	5	5	53	5
2.	3	5	3	9	21	20	12	26	23
Fourth Day									
1.	1	7	2	3	38	12	4	45	14
2.	2	6	2	4	30	19	6	36	21
3.	2	6	2	5	32	16	7	38	18
4.		10		1	48	2	1	58	2
Total:	1	8	2	3	32	18	4	40	20

# STEPS IN ANALYSIS OF RESPONSES TO THE SEMANTIC-DIFFERENTIAL SCALE

1. A numeric value of -2 to +2, pivoting on 0, was given to each response of the thirteen scored pairs of polar adjectives for both pre- and post-tests. (Six scales were inserted only for screening.)

Example: -2 Meaningless-----M aningful +2  
+2 Happy-----Sad -2

2. The numeric values of the thirteen ratings on each sheet were totaled, yielding a composite score in the range of -26 to +26.
3. The grand mean and standard deviations for both the pre- and post-tests were then computed.

## Pre-test

$\bar{X} = 9.30$   
 $S_1^2 = 75.99$   
 $N = 63$

## Post-test

$\bar{X} = 15.54$   
 $S_1^2 = 24.61$   
 $N = 63$

4. The most proper statistical treatment would have been the correlated t-test; however, since the lack of identification on the tests made it impossible to match papers in the pre- and post-groups, the standard t-test was used.
5. The values in step 3 were substituted in the formula

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\left( \frac{N_1 S_1^2 + N_2 S_2^2}{N_1 + N_2 - 2} \right) \left( \frac{1}{N_1} + \frac{1}{N_2} \right)}}$$

6. The t value was computed to be 23.998 which reached the .001 level of significance, in favor of the post-tests.